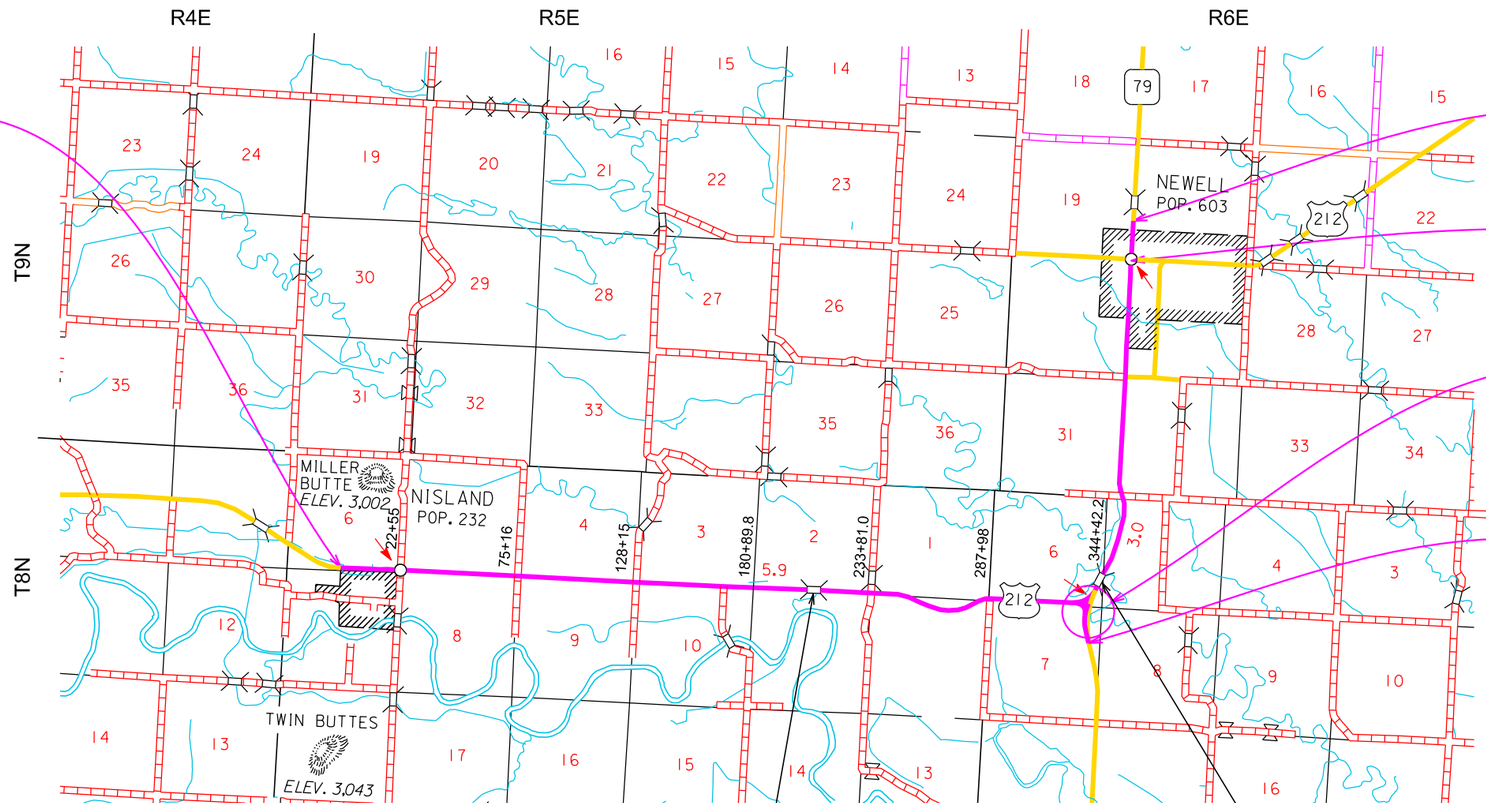
SECTION B: GRADING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B1	B50

Plotting Date: 04/10/2024

INDEX OF SHEETS



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SECTION B ESTIMATE OF QUANTITIES - PCN 06CP
US Highway 212

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3230	Grade Staking	0.166	Mile
009E3240	Graded Centerline Staking	0.166	Mile
009E3250	Miscellaneous Staking	0.166	Mile
009E3280	Slope Staking	0.166	Mile
009E3301	Engineer Directed Surveying/Staking	40.0	Hour
110E0510	Remove Pipe End Section	13	Each
110E0600	Remove Fence	150	Ft
110E0700	Remove 3 Cable Guardrail	270	Ft
110E0730	Remove Beam Guardrail	587.5	Ft
110E7500	Remove Pipe for Reset	4	Ft
110E7510	Remove Pipe End Section for Reset	1	Each
120E0010	Unclassified Excavation	11,731	CuYd
120E2000	Undercutting	4,133	CuYd
250E0020	Incidental Work, Grading	Lump Sum	LS
270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	5,770.2	Ton
421E0100	Pipe Culvert Undercut	18	CuYd
450E0122	18" RCP Class 2, Furnish	36	Ft
450E0130	18" RCP, Install	36	Ft
450E0142	24" RCP Class 2, Furnish	280	Ft
450E0150	24" RCP, Install	280	Ft
450E2008	18" RCP Flared End, Furnish	11	Each
450E2009	18" RCP Flared End, Install	11	Each
450E2016	24" RCP Flared End, Furnish	5	Each
450E2017	24" RCP Flared End, Install	5	Each
450E4759	18" CMP 16 Gauge, Furnish	100	Ft
450E4760	18" CMP, Install	100	Ft
450E5211	18" CMP Flared End, Furnish	3	Each
450E5212	18" CMP Flared End, Install	3	Each
* 450E8900	Cleanout Pipe Culvert	9	Each
450E9000	Reset Pipe	4	Ft
450E9001	Reset Pipe End Section	1	Each
620E0020	Type 2 Right-of-Way Fence	150	Ft
620E0520	Type 2 Temporary Fence	150	Ft
620E1020	2 Post Panel	2	Each
630E0110	Straight Double Class A Thrie Beam Guardrail with Wood Posts	12.5	Ft
630E0500	Type 1 MGS	150.0	Ft
630E1010	Straight Class A W Beam Guardrail with Wood Posts	137.5	Ft
630E1025	Curved Class A W Beam Guardrail with CRT Posts	25.0	Ft
630E1501	Type 1 Retrofit Guardrail Transition	3	Each
630E2000	W Beam to Thrie Beam Guardrail Transition	1	Each
630E2018	MGS MASH Tangent End Terminal	3	Each
630E2035	W Beam Guardrail Special Anchor Assembly	1	Each
632E2220	Guardrail Delineator	20	Each
720E1010	PVC Coated Bank and Channel Protection Gabion	4.5	CuYd
831E0110	Type B Drainage Fabric	15	SqYd

*** - Denotes Non-Participating**

SECTION B ESTIMATE OF QUANTITIES - PCN 04L0
US Highway 212 & SD Highway 79

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3230	Grade Staking	0.831	Mile
009E3240	Graded Centerline Staking	0.600	Mile
009E3250	Miscellaneous Staking	0.600	Mile
009E3280	Slope Staking	0.600	Mile
009E3301	Engineer Directed Surveying/Staking	40.0	Hour
110E0600	Remove Fence	1,666	Ft
120E0010	Unclassified Excavation	34,819	CuYd
120E0600	Contractor Furnished Borrow Excavation	12,013	CuYd
120E2000	Undercutting	14,211	CuYd
240E0010	Obliterate Old Road	30	Sta
250E0020	Incidental Work, Grading	Lump Sum	LS
270E0040	Salvage and Stockpile Asphalt Mix and Granular Base Material	18,614.6	Ton
450E0142	24" RCP Class 2, Furnish	226	Ft
450E0150	24" RCP, Install	226	Ft
450E2016	24" RCP Flared End, Furnish	4	Each
450E2017	24" RCP Flared End, Install	4	Each
450E5215	24" CMP Flared End, Furnish	2	Each
450E5216	24" CMP Flared End, Install	2	Each
450E5227	42" CMP Flared End, Furnish	1	Each
450E5228	42" CMP Flared End, Install	1	Each
450E8910	Cleanout for Culvert Treatment	1	Each
450E9524	24" Cured in Place Pipe	164	Ft
600E0300	Type III Field Laboratory	1	Each
620E0040	Type 4 Right-of-Way Fence	1,666	Ft
620E0530	Type 3 Temporary Fence	948	Ft
620E1020	2 Post Panel	8	Each
670E4200	Type M Median Drain	1	Each
670E4205	Type M Frame and Grate Assembly	1	Each
720E1010	PVC Coated Bank and Channel Protection Gabion	4.5	CuYd
831E0110	Type B Drainage Fabric	15	SqYd

GRADING OPERATIONS

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste.

Special ditch grades and other sections of the roadway different than the typical section(s) will be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer will contact the Designer for the proposed change.

Generally, all shallow inlet and outlet ditches as noted on the plan sheets will be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

Temporary fence and/or permanent fence will be placed ahead of the grading operation unless otherwise directed by the Engineer.

TYPE III FIELD LABORATORY

Revised 7/9/2024 NJF

The lab will be equipped with an internet connection such as DSL, cable modem, or other approved service. The internet connection will be provided with a multi-port wireless router. The internet connection will be a minimum speed of 5 Mbps unless limited by job location and approved by the DOT. Prior to installing the wireless router, the Contractor will submit the wireless router's technical data to the Area Office to check for compatibility with the state's computer equipment. The internet connection is intended for state personnel usage only. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer. These items will be incidental to the contract unit price per each for "Type III Field Laboratory".

UTILITIES

The Contractor will be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor will contact each utility owner and confirm the status of all existing and new utility facilities. The utility contact information is provided elsewhere in the plans or bidding documents.

COORDINATION WITH OTHER PROJECTS P 0079(88)133, PCN 06G1 & NH 0212(202)38, PCN 06G2

The ADA curb ramp and sidewalk on project P 0079(88)133, PCN 06G1 and NH 0212(202)38, PCN 06G2 is schedule for the construction season of 2025. The location of this project is along SD79/US212 from 2nd Street to 9th Street and US212 from Dartmouth Avenue to Girard Avenue. The Contractor on this project will coordinate with the Contractor on the ADA curb ramp and sidewalk project, so that work activities do not conflict. The Contractor for the project is unknown at this time. All costs associated with this coordination will be incidental to the various bid items on the project.

BELLE FOURCHE IRRIGATION DISTRICT

The Contractor will contact the Belle Fourche Irrigation District (605-456-2541) and any necessary landowners to coordinate pipe work with irrigation season.

All costs associated with this coordination will be incidental to the various bid items on the project.

IN-PLACE PERMANENT TRAFFIC MONITORING SITE

The SDDOT Office of Inventory Management & Research has a permanent traffic monitoring site located on SD79 at approximately MRM 129+0.630, just south of the intersection with US 212.

No work will be allowed within 30 feet of either side of loops installed in the pavement. The loops are easily seen on the roadway. If assistance is needed to locate the loops, the SDDOT Office of Inventory Management & Research can be contacted at 605-773-6644. The Contractor must conduct work in a manner that does not damage the existing loops, poll boxes, conduit, or electronics cabinet. Any poll boxes, conduit, cabinet, or loops damaged during the construction project will be replaced by the Contractor at the Contractor's expense.

OBLITERATING OLD ROAD

The Contractor will obliterate existing roadways at the locations listed in the Table of Obliterating Old Road.

The surfacing material of the existing roadway will be salvaged. Refer to the Salvage and Stockpile Asphalt Mix and Granular Base Material note for quantities and payment information.

The Contractor will obliterate the existing roadway in accordance with Section 240 of the Specifications when the existing roadway is not being removed in accordance with the template section.

The earthwork necessary for obliterating the existing road will be accomplished to such an extent that placing topsoil and seeding can be done in a satisfactory manner. Quantities of topsoil, fertilizing, mulching, and seeding for the obliterated sections of the old road are included in the Section D - Erosion and Sediment Control Plans Estimate of Quantities.

TABLE OF OBLITERATE OLD ROAD – PCN 04L0

Highway	Station	to	Station	L/R	Length (Sta)
SD 79	9+40		26+00	L	17
SD 79/US 212	328+35		331+45	R	5
SD 79	25+85		32+00	L	8
				Total:	30

SHRINKAGE FACTOR: Embankment +35%

TABLE OF EXCAVATION QUANTITIES BY BALANCES – PCN 04L0

Road Segment	Station to	Station	Excavation (CuYd)	* Undercut (CuYd)	* Contractor Furnished Borrow Exc. (CuYd)	Total Excavation (CuYd)	** Waste (CuYd)
SD 79	5+82	37+00	5,295	13,356	12,013	30,664	-
SB Right Turn	1+00	5+00	2,165	855	-	3,020	1,214
		Totals:	7,460	14,211	12,013	33,684	1,214

TABLE OF UNCLASSIFIED EXCAVATION – PCN 04L0

	(CuYd)
Excavation	7,460
Undercut	14,211
Topsoil	3,200
Outlet Channel at 17+45 Rt	100
Salvaged Asphalt Mix and Granular Base Material (from cut sections)	8,106
Salvaged Asphalt Mix and Graular Base Material (from off-alignment roadways or from obliterated roads)	1,742
Total	34,819

TABLE OF EXCAVATION QUANTITIES BY BALANCES – PCN 06CP

Road Segment	Station to	Station	Excavation (CuYd)	* Undercut (CuYd)	Total Excavation (CuYd)	** Waste (CuYd)
US 212	324+00	332+78	4,545	4,133	8,678	2,963
		Totals:	4,545	4,133	8,678	2,963

* The quantities for these items are in the Estimate of Quantities under their respective contract items.
** The quantities for these items are for information only.

TABLE OF UNCLASSIFIED EXCAVATION – PCN 06CP

	(CuYd)
Excavation	4,545
Undercut	4,133
Salvaged Asphalt Mix and Granular Base Material (from cut sections)	3,053
Total	11,731

PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY

When plan quantities are used for payment, the Unclassified Excavation quantity will be used for final payment and the plans quantity of Topsoil and salvaged surfacing items listed in the Table of Unclassified Excavation will not be adjusted according to field measurements.

The following paragraphs are general earthwork information and information in regard to computing the Unclassified Excavation quantity when final cross sections are taken in the field:

The Unstable Material Excavation quantity is included in the Excavation quantity listed in the Table of Unclassified Excavation. When finaling a project, the Unstable Material Excavation quantity will be added to the Excavation quantity to compute the Unclassified Excavation quantity.

The Topsoil quantity in the Table of Unclassified Excavation is an estimate. When finaling a project, the total quantity of field measured Topsoil will be used in place of the estimated Topsoil quantity. The quantity of Topsoil from the cuts will be paid for twice as Unclassified Excavation, as it will be in both the Excavation and Topsoil quantities. This will be full compensation for Excavation, which includes necessary undercutting to provide space for placement of topsoil.

The Excavation quantities from individual balances and the Table of Unclassified Excavation have been reduced by the volume of in place surfacing that will be removed and/or salvaged.

Salvaged Asphalt Mix and Granular Base Material will be paid for at the contract unit price per ton and is also included in and paid for once as Unclassified Excavation. As shown in the Table of Unclassified Excavation, the estimated quantity of 3,294 cubic yards of Salvaged Asphalt Mix and Granular Base Material from off-alignment roadways or obliterated old roads will be added to the Excavation quantity to determine the Unclassified Excavation quantity. When finaling a project, the quantities of Salvaged Asphalt Mix and Granular Base Material from fill sections and off-alignment roadways or obliterated old roads will not be adjusted according to field measurements. The quantity of Salvaged Asphalt Mix and Granular Base Material from cut sections will not be added to the Excavation quantity as it is already in the cuts on the final cross sections.

UNDERCUTTING

In all cut sections the earthen subgrade will be undercut 2 feet below the earthen subgrade surface. The undercut material or other suitable material, as directed by the Engineer, will then be replaced and compacted to the density specified for the section being constructed.

Shallow embankment sections, fills less than 2 feet in height measured at the finished subgrade shoulders, will be undercut to ensure a minimum 2 foot height of earth embankment for the entire width of roadbed. The upper 6 inches of undercut material that consists of topsoil with a high humus content will be used as topsoil, placed in the fill slopes outside the shoulders of the earthen subgrade, or placed in the lower portion (below 4 foot depth) in fills which are greater than 4 feet in height. The remaining undercut soil and soil obtained from adjacent excavation (excluding the upper 4 inches) will then be replaced and compacted to the density specified for the section being constructed.

The plan shown quantity will be the basis of payment. However, if there are additional areas of undercut other than what is shown in the plans, the Engineer will direct removal of these areas and the additional areas will be measured according to the Engineer.

TABLE OF UNDERCUTTING LOCATIONS

Station	to	Station	Comments
5+82		37+00	SD 79
324+00		332+78	US212

UNSTABLE MATERIAL EXCAVATION

The areas of unstable material excavation are drawn on the cross sections with a normal depth of 2 feet. The estimated quantity of 585 cubic yards of unstable material excavation will be paid for at the contract unit price per cubic yard for “Unclassified Excavation”.

All areas designated as Unstable will be excavated. The unstable material excavated on this project will be placed outside the subgrade shoulder in fill sections or stockpiled and used as topsoil.

Field measurement of unstable material excavation will not be made. However, if there are additional areas of unstable material excavation other than what is shown in the plans, the Engineer will direct removal of these areas and the additional areas will be measured according to the Engineer.

TABLE OF UNSTABLE MATERIAL EXCAVATION

Station	to	Station	L/R	Depth (Ft)	Quantity (CuYd)
16+00		17+45	L	2	184
23+00		25+40	L	2	252
27+00		28+00	L	2	149
				Total:	585

SALVAGE AND STOCKPILE ASPHALT MIX AND GRANULAR BASE MATERIAL

The Los Angeles Abrasion Loss value on the aggregate used for the in-place asphalt concrete was 22. This value was obtained from testing during construction of the in-place asphalt concrete.

An estimated 15,321 tons (8,106 Cubic Yards) from SD79, an estimated 5,770 tons (3,053 Cubic Yards) from US212, and an estimated 3,294 tons (1,742 Cubic Yards) from the existing ramps of asphalt mix and granular base material will be salvaged according to the in-place surfacing typical sections and stockpiled at a site furnished by the Contractor and satisfactory to the Engineer.

Salvaged material will be processed to meet the requirements of Section 884.2 D.7 prior to stockpiling. The Contractor will ensure that no vegetation, topsoil, subgrade, or other foreign material is incorporated into the salvaged asphalt mix and granular base material.

The salvaged material not used on the project will be stockpiled or disposed of as directed by the Engineer.

The quantity of salvaged asphalt mix and granular base material may vary from the plans.

The quantity of salvageable material is estimated from the in-place surfacing typical sections. This estimated quantity was included in the unclassified excavation quantities.

CONTRACTOR FURNISHED BORROW EXCAVATION

The Contractor will provide a suitable site for Contractor furnished borrow excavation material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site. The borrow material will be approved by the Engineer. The plans quantity for “Contractor Furnished Borrow Excavation” as shown in the Estimate of Quantities will be the basis of payment for this item.

Restoration of the Contractor furnished borrow excavation site will be the responsibility of the Contractor.

TABLE OF CLEANOUT PIPE CULVERT – PCN 06CP

MRM	Station	Pipe Size and Material	Quantity (Each)
30+0.188	14+45	18” RCP	1
30+0.638	38+50	18” RCP	1
31+0.803	99+40	18” RCP	1
32+0.363	127+70	18” RCP	1
36+0.025	321+89	18” CMP	1
37+0.183	79+00	18” RCP	1
37+0.363	88+45	18” RCP	1
38+0.050	124+65	18” CMP	1
38+0.128	128+80	18” RCP	1
		Total:	9

TABLE OF CONTRACTOR FURNISHED BORROW – PCN 04L0

Station to	Station	Contractor Furnished Borrow (CuYd)	Comments
5+32	37+00	12,013	Intersection Regrade
	Total:	12,013	

INCIDENTAL WORK, GRADING – PCN 06CP

MRM	Station	L/R	Remarks
32+0.898	155+85		Remove 72’ PVC Water Lines
33+0.364	178+35	L/R	Shape Inlet & Outlet Ditches to ROW
35+0.337	287+40	L/R	Shape Inlet & Outlet Ditches to ROW
35+0.457	293+14	L	Take Out Headwall & 18” CMP
35+0.457	293+55	L/R	Shape Inlet & Outlet Ditches to ROW
35+0.530	297+34	L	Take Out Headwall & 18” CMP
35+0.788	311+00	L	Shape Ditch to ROW
35+0.863	314+98	R	Take Out Headwall & 18” CMP
35+0.863	314+98	L/R	Shape Inlet & Outlet Ditches to ROW
36+0.025	321+89	L/R	Shape Inlet & Outlet Ditches to ROW
37+0.183	79+00	L	Shape Ditch to ROW
37+0.795	111+23	L	Shape Ditch to ROW
38+0.050	124+65	R	Take Out Headwall
38+0.128	128+80	R	Take Out Headwall
38+0.128	128+80	L	Take Out 18”-4’ RCP

INCIDENTAL WORK, GRADING – PCN 04L0

MRM	Station	L/R	Remarks
129.71+0.06	12+10	R	Fill Void in Inslope (±5 CuYd)
129.71+0.06	12+10	R	Take Out 24”-20’ CMP & End Sections L&R
129.71+0.163	17+45	L	Take Out 24”-78’ CMP & End Sections
129.71+0.163	17+45		Take Out 24”-220’ CMP, Elbows, & End Sections
*130+0.022	23+04	L	Take Out 42”-132’ CMP w/Slipliner & End Section L
130.02+0.025	25+44		Take Out 18”-92’ RCP & End Sections
130.02+0.025	25+60	L	Take Out 18”-70’ CMP & End Sections
36.19+0.022	27+45		Take Out 18”-73’ CMP & End Sections
35.97+0.068	28+78	L	Take Out 18”-82’ RCP & End Sections

*The existing sliplined pipe is a 40” ISCO Snap-Tite pipe with 2” or greater solid wall.

MAINLINE CROSS PIPE REPLACEMENT

Pipe culverts at MRM 35+0.863 (Sta. 314+98, US212) will be installed in accordance with the following notes and as shown on the Pipe Installation Detail.

This work will be completed prior to beginning cold milling on the project.

After the existing pipe has been removed, the new pipe culvert will be undercut to a minimum depth of 1 foot. The depth of undercut is an estimate and the actual depth necessary will be determined during construction. The Engineer will determine how much undercut will be done in accordance with Section 421 of the specifications but will not reduce the undercut to less than 1 foot in depth.

Select fill material for backfilling the undercut area will conform to the gradation requirements of Base Course in Section 882. If groundwater is encountered during construction, the select fill material for backfilling the undercut area and Class B Bedding will conform to the gradation requirements of Section 421.2 A. until backfill placement is above the groundwater level. The Engineer will process a CCO to provide for compensation to the Contractor for the added cost of the changed material. All other requirements of Section 421 will apply.

Pipe culverts will be bedded in accordance with Section 450.3 F.2, Class B Bedding with the following exceptions. The excavated area will extend 2 feet from the outermost diameter on both sides of the pipe with the back of the excavated area being sloped 2:1 upward to the top of the roadway surface. Select fill material for Class B Bedding will conform to the gradation requirements of Base Course in Section 882.

After the minimum testing requirements of M.S.T.R Section 4.1.F.3.a.1 (SDDOT Materials Manual) have been met, the minimum density testing requirements will be one test per zone. Each zone from the top of the pipe to the top of the subgrade will be 2 feet in depth. Moisture testing will remain as per M.S.T.R.

The remainder of the pipe culvert excavation will be backfilled with soils taken from the pipe removal excavation or other suitable material as approved by the Engineer. The backfill will be benched into 2:1 excavation slope. Compaction of the backfill material will be governed by the Specified Density Method.

After the new pipe has been backfilled to the top of the subgrade, a 12” depth of Base Course and 5” (2-2.5” lifts) depth of asphalt concrete composite will be placed as a patch matching the existing asphalt concrete.

All costs to remove and dispose of asphalt concrete pavement, including full depth saw cutting of the asphalt concrete pavement, will be incidental to the contract unit price per square yard to Remove Asphalt Concrete Pavement. All excavation necessary for Class B Bedding and the pipe installation will be incidental to the contract unit price per foot for the corresponding pipe installation contract items. The excavation of material for pipe culvert undercut will be paid for at the contract unit price per cubic yard for Pipe Culvert Undercut.

The select fill material used for backfilling the pipe culvert undercut and Class B Bedding will be paid for at the contract unit price per ton for Base Course. The 3” layer of bedding material to form the cradle in the pipe foundation will be incidental to the corresponding pipe installation contract items. The cost for asphalt concrete composite installed over the pipe replacement will be paid for at the contract unit price per ton for Asphalt Concrete Composite.

PIPE CULVERT UNDERCUT

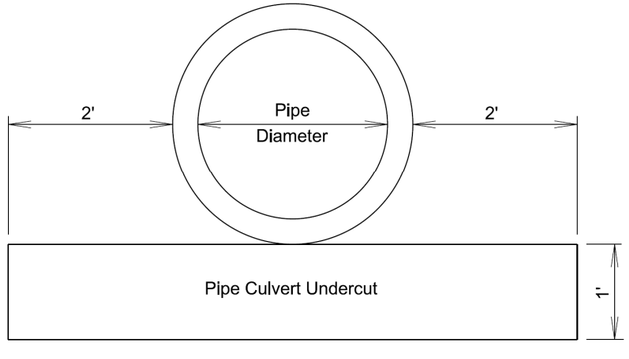
Pipe culvert undercut may be required for this project. The Engineer will determine which pipe will be undercut in accordance with Section 421 of the Specifications.

If pipe culvert undercut is required, the table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

The table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1’ Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1’ Depth (CuYd/Ft)
24	0.2407	0.2577
30	0.2623	0.2847
36	0.2840	0.3110
42	0.3056	0.3337
48	0.3272	0.3596
54	0.3488	0.3827
60	0.3704	0.4105
66	0.3920	---
72	0.4136	0.4630
78	0.4352	---
84	0.4568	0.5123
90	0.4784	---



CORRUGATED METAL PIPE

Metal pipe end sections will be aluminum-coated (Type 2) in accordance with AASHTO M36 as specified in the Table of Pipe Quantities. All costs associated for gauge, coating, and connections will be incidental to the corresponding CMP End Section contract items.

REINFORCED CONCRETE PIPE

High sulfate levels are likely to be encountered on this project. The type of cement will be either a Type II or a Type V with 20% to 25% Class F Modified Fly Ash substituted for cement in accordance with Section 605 of the Specifications. The Water/Cementitious material ratio will not exceed 0.45 as defined in Section 460.3 C of the Specifications. The mix will be as per the fabricator's design; however, minimum compressive strength will not be less than 4500 psi at 28 days. The pipe must be marked in an acceptable way to designate meeting requirements for sulfate resistance.

CLEANOUT FOR CULVERT TREATMENT

Cleanout of pipe culvert will be done in advance of the culvert linings.

Material in existing pipe culvert will be cleaned out by water flushing or other approved methods.

Material removed from the pipe culvert will become property of the Contractor for disposal.

The Contractor will implement appropriate sediment control measures prior to water flushing to prevent discharges from the project boundaries.

The pipe culvert will be cleaned to the satisfaction of the Engineer.

All costs to dewater, clean pipe, and dispose of removed materials will be incidental to the contract unit price per each for “Cleanout for Culvert Treatment”.

CURED-IN-PLACE PIPE (CIPP)

This work consists of rehabilitating existing drainage culverts by furnishing and installing Glass Reinforced thermosetting Plastic (GRP) Cured-in-Place Pipe (CIPP) liners using Ultraviolet (UV) cure methods. See Special Provision for specifications related to this work.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B6	B50

Revised 6/20/2024 NJF

TABLE OF PIPE QUANTITIES

								Reinforced Concrete				Corrugated Metal				CIPP Liner	
								Circular		Circular Flared End		#Circular	#Circular Flared End				
MRM	Station	Offset (L/R)	Remove Pipe End Section	Remove Pipe End Section for Reset	Reset Pipe End Section	Remove Pipe for Reset	Reset Pipe	18"	24"	18"	24"	18"	18"	24"	42"	24"	Cleanout for Culvert Treatment
			Each	Each	Each	Ft	Ft	Ft	Ft	Each	Each	Ft	Each	Each	Each	Ft	Each
US212 - PCN 06CP																	
30+0.638	38+37	L	1					4		1							
31+0.349	74+80	R	1						4		1						
31+0.803	99+40	L	1							1							
31+0.578	87+38	L	1					4		1							
34+0.943	263+00	R		1	1	4	4			1							
34+1.036	268+00	R	1							1							
35+0.337	287+40	L/R	2							2							
35+0.457	293+55	L	1							1							
35+0.530	297+34	L/R							138		2						
35+0.788	311+00	L	1							1							
35+0.863	314+98	L/R							138		2						
36+0.025	321+89	L/R	2									80	2				
36.42+0.109	348+87	L	1					4									
38+0+0.050	124+65	R										20	1				
38+0.128	128+80	R						20		1							
38+0.128	128+80	L	1					4		1							
PCN 06CP TOTAL:			**13**	**1**	**1**	**4**	**4**	**36**	**280**	**11**	**5**	**100**	**3**	**0**	**0**	**0**	**0**
SD79 - PCN 04L0																	
129.71+0.06	12+10													2		164	1
129.71+0.163	17+45								94		2						
130+0.022	23+04	L													1		
SD79 & US212																	
36.19+0.022	27+45								132		2						
PCN 04L0 TOTAL:			**0**	**0**	**0**	**0**	**0**	**0**	**226**	**0**	**4**	**0**	**0**	**2**	**1**	**164**	**1**

(#) Aluminum Coated (type 2) in accordance with AASHTO M36. See Section B notes for additional information.

TABLE OF TYPE M MEDIAN DRAINS

(Quantities Shown for Information Only)

Station	L/R	Class M6 Concrete (CuYd)	Reinforcing Steel (Lb)	Type M Frame and Grate Assembly (Each)
27+45	L	1.81	231	1
	Totals:	1.81	231	1

TABLE OF PVC COATED BANK AND CHANNEL PROTECTION GABIONS AND DRAINAGE FABRIC – PCN 06CP

Station (MRM)	L/R	PVC Coated Bank and Channel Protection Gabion (CuYd)	Type B Drainage Fabric (SqYd)
293+55 (35+0.457)	L	4.5	15
	Totals:	4.5	15

TABLE OF PVC COATED BANK AND CHANNEL PROTECTION GABIONS AND DRAINAGE FABRIC – PCN 04L0

Station (MRM)	L/R	PVC Coated Bank and Channel Protection Gabion (CuYd)	Type B Drainage Fabric (SqYd)
12+10 (129.71+0.06)	R	4.5	15
	Totals:	4.5	15

TEMPORARY FENCE

The Contractor will verify the location of the temporary fence with the landowner prior to installation of the fence.

BRACE PANELS FOR ROW FENCE

The E-Z Brace or an approved equal may be utilized as an alternate horizontal brace in the brace panels if approved by the Engineer. The E-Z Brace will be attached to each wood post utilizing two 5/16" x 3" lag screws. Holes of appropriate diameter, based on wood post condition, will be drilled before placement of lag screws. The following is the contact regarding the E-Z Brace:

Charlie Mack
Macksteel E-Z Braces
415 20th Ave. SE.
Watertown, SD 57201
605-882-2177

TABLE OF FENCE QUANTITIES

			Right-of-Way Fence			Temporary Fence			Post Panels		
Station to Station		Side (L/R)	Type 2 (Ft)	Type 4 (Ft)		Type 2 (Ft)	Type 3 (Ft)		2 Post Panel (Each)		Remove Fence (Ft)
PCN 06CP - US 212											
292+45	293+95	L	150			150			2		150
PCN 06CP TOTAL:			**150**			**150**			**2**		**150**
PCN 04L0 - SD 79 & US 212											
10+00	17+18	L		718					2		718
13+70	17+30	R		360			360		2		360
19+80	22+89	R		309			309		2		309
23+40	26+19	R		279			279		2		279
PCN 04L0 TOTAL:				**1666**			**948**		**8**		**1666**

Post Type and Sequence:
Right-of-way fence will be constructed using alternate wood and steel posts except as noted.

TABLE OF GUARDRAIL – PCN 06CP

Location	Remove Beam Guardrail (Ft)	Remove 3 Cable Guardrail (Ft)	Type 1 MGS (Ft)	Type 1 Retrofit Guardrail Transition (Each	W Beam to Thrie Beam Guardrail Transition (Each)	Straight Double Class A Thrie Beam Guardrail with Wood Posts (Ft)	Straight Class A W Beam Guardrail with Wood Posts (Ft)	Curved Class A W Beam with CRT Posts (Ft)	MGS MASH Tangent End Terminal (Each)	W Beam Guardrail Special Anchor Assembly (Each)	Guardrail Delineator (Each)
Str. No. 10-309-368 (MRM 36.42)											
Begin Bridge Lt.	156.25		25.0	1					1		5
Begin Bridge Rt.	81.25	270	87.5	1					1		5
End Bridge Lt.	156.25				1	12.5	137.5	25		1	5
End Bridge Rt.	193.75		37.5	1					1		5
Totals:	**587.5**	**270**	**150.0**	**3**	**1**	**12.5**	**137.5**	**25**	**3**	**1**	**20**

Revised 7/9/2024 NJF

TABLE OF SUPERELEVATION – SD79

Station	to	Station		
5+82.00		5+96.10	-	Normal Crown Section
5+96.10		7+94.10	-	Superelevation Transition
		34+15.07	-	3820’ Radius Curve Right 0.046/’ Superelevation Rate
34+15.07		36+13.07	-	Superelevation Transition
36+13.07		190+33.92	-	Normal Crown Section

TABLE OF SUPERELEVATION – SOUTHBOUND RIGHT TURN LANE

Station	to	Station		
0+00		1+09.00	-	Superelevation Transition
		3+15.00	-	250’ Radius Curve Left 0.040’/’ Superelevation Rate Point of Rotation at 12’ Right of Centerline
3+15.00		4+51.00	-	Superelevation Transition
4+51.00		9+27.13	-	3838’ Radius Curve Right 0.046/’ Superelevation Rate Point of Rotation at 12’ Right of Centerline

TABLE OF CONSTRUCTION STAKING FOR PROJECT NH-P-PH 0079(87)129, PCN 04L0

(See Special Provision for Contractor Staking)

					Grade Staking						
Roadway and Description	Begin Station	End Station	Number of Lanes	Length (Ft)	Length (Mile)	Lane Factor	*Sets of Stakes	**Grade Staking Quantity (Mile)	Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)	Graded Centerline Staking Quantity (Mile)
SD 79 (2 Lanes)	5+28	10+95	2	567	0.107	1	1	0.107	0.107	0.107	0.107
SD79 (Transition from 2 Lanes to 3 Lanes)	10+95	19+35	3	840	0.159	1.5	1	0.239	0.159	0.159	0.159
SD 79 (3 Lanes AC Pavement)	19+35	26+85	3	750	0.142	1.5	1	0.213	0.142	0.142	0.142
SD 79 (Transition from 3 Lanes to 2 Lanes)	26+85	35+25	3	840	0.159	1.5	1	0.239	0.159	0.159	0.159
SD 79 (2 Lanes)	35+25	37+00	2	175	0.033	1	1	0.033	0.033	0.033	0.033
							Totals:	0.831	0.600	0.600	0.600

* 1 = Blue Top Stakes Only (Asphalt Concrete Pavement)

** Grade Staking Quantity = (Length) x (Lane Factor) x (Sets of Stakes)

TABLE OF CONSTRUCTION STAKING FOR PROJECT NH 0212(193)28, PCN 06CP

(See Special Provision for Contractor Staking)

					Grade Staking						
Roadway and Description	Begin Station	End Station	Number of Lanes	Length (Ft)	Length (Mile)	Lane Factor	*Sets of Stakes	**Grade Staking Quantity (Mile)	Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)	Graded Centerline Staking Quantity (Mile)
US 212 (2 Lanes)	324+00	332+78	2	878	0.166	1	1	0.166	0.166	0.166	0.166
							Totals:	0.166	0.166	0.166	0.166

* 1 = Blue Top Stakes Only (Asphalt Concrete Pavement)

** Grade Staking Quantity = (Length) x (Lane Factor) x (Sets of Stakes)

TYPICAL GRADING SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B9	B50

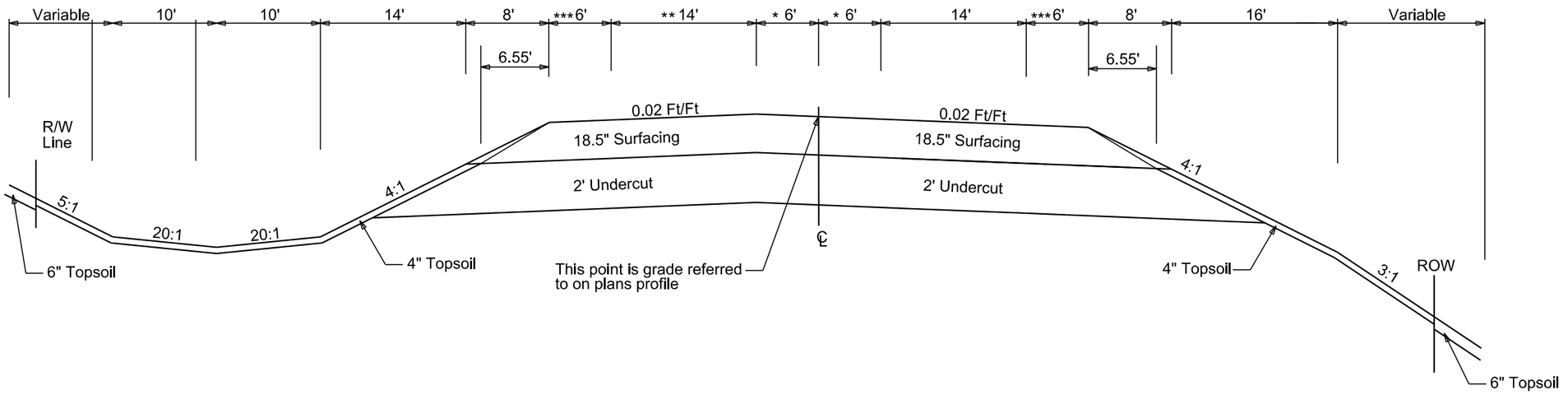
Plotting Date: 04/15/2024 Revised 4/15/2024 NJF

Transitions:
** 26' from Sta. 29+69.5 to Sta. 33+96
** 26' to 14' from Sta. 33+96 to Sta. 35+15
** 14' from Sta. 35+15 to Sta. 37+00

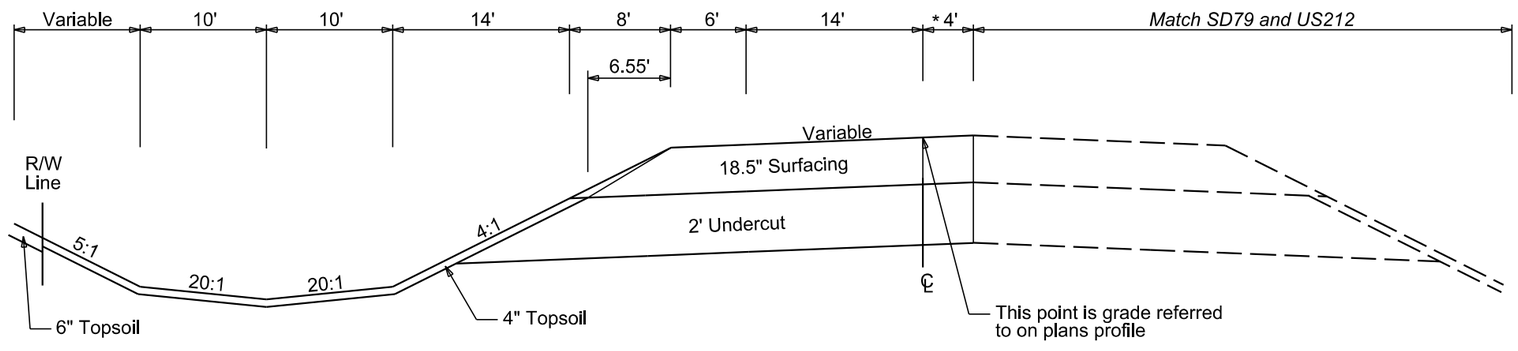
Transitions:
*** 4' from Sta. 5+82 to Sta. 8+00
** 4' to 6' from Sta. 8+00 to Sta. 10+00
** 6' from Sta. 10+00 to Sta. 37+00

SD79
5+82 to 37+00

Transitions:
* 0' from Sta. 5+82 to Sta. 10+70
* 0' to 6' from Sta. 10+70 to Sta. 19+10
* 6' from Sta. 19+10 to Sta. 26+75
* 6' to 0' from Sta. 26+75 to Sta. 35+15
* 0' from Sta. 35+15 to Sta. 37+00



Southbound Right Turn Lane
1+00 to 5+00



Transitions:
* 4' to 0' from Sta. 3+19 to Sta. 3+94
* 0' from Sta. 3+94 to Sta. 5+00

Station of SB Turn Lane (Station on SD 79)
3+19 (27+90)
3+94 (28+64)
5+00 (29+69.5)

Plot Scale - 1:200
Plotted From - trnc11626
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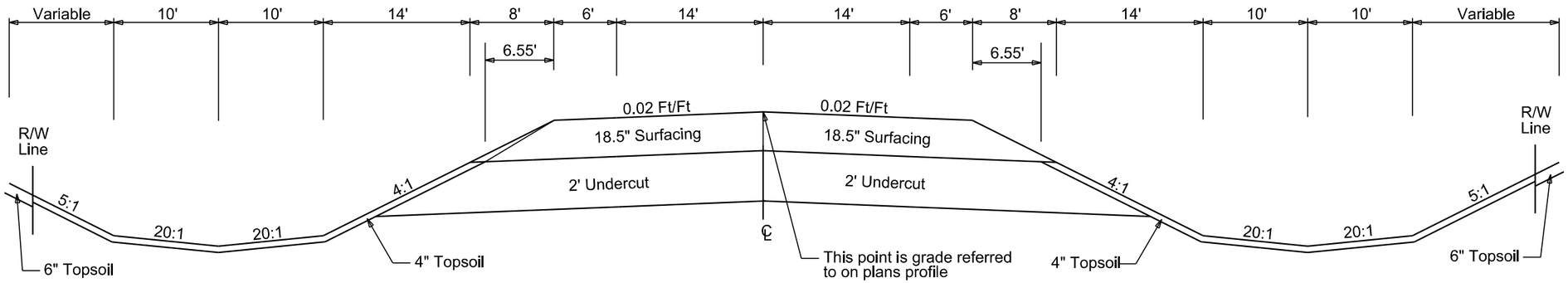
TYPICAL GRADING SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B10	B50

Plotting Date: 04/15/2024 Revised 4/15/2024 NJF

US212
324+00 to 332+78



Plot Scale - 1:200

Plotted From - trrc11626

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B11	B50

HORIZONTAL ALIGNMENT DATA

US 212

Type	Station			Northing	Easting
POB	-3+65.92			327775.031	1043176.879
		TL= 24674.61	S 87°55'14" E		
PC	243+08.69			326879.761	1067835.238
PI	247+89.14	R = 2864.80	Delta = 19°02'27" R	326862.329	1068315.377
PT	252+60.74			326689.208	1068763.558
		TL= 535.15	S 68°52'47" E		
PC	257+95.88			326496.380	1069262.758
PI	268+00.11	R = 2864.80	Delta = 38°38'06" L	326134.532	1070199.522
PT	277+27.64			326436.754	1071157.188
		TL= 551.26	N 72°29'07" E		
PC	282+78.90			326602.656	1071682.888
PI	287+86.77	R = 2864.80	Delta = 20°06'22" R	326755.501	1072167.217
PT	292+84.20			326732.540	1072674.571
		TL= 3258.02	S 87°24'32" E		
PC	325+42.22			326585.245	1075929.262
PI	327+43.06	R = 6480.00	Delta = 3°33'01" L	326576.165	1076129.890
PT	329+43.76			326579.527	1076330.695
		TL= 22.74	N 89°02'27" E		
PC	329+66.50			326579.907	1076353.428
PI	330+96.60	R = 1000.00	Delta = 14°49'29" R	326582.085	1076483.508
PT	332+25.24			326550.908	1076609.814
		TL= 84.16	S 76°08'03" E		
POE	333+09.40			326530.739	1076691.521

SD 79 & US 212

Type	Station			Northing	Easting
POB	5+82.00			324496.211	1076725.672
		TL= 271.90	N 12°46'02" W		
PC	8+53.90			324761.389	1076665.585
PI	23+16.33	R = 3820.00	Delta = 41°53'50" R	326187.663	1076342.401
PT	36+47.26			327465.123	1077054.303
		TL= 47.94	N 29°07'48" E		
PI	36+95.19			327506.998	1077077.639
		TL= 680.87	N 26°33'31" E		
PI	43+76.07			328116.023	1077382.067
		TL= 759.95	N 25°57'55" E		
PC	51+36.02			328799.266	1077714.793
PI	61+84.08	R = 3819.70	Delta = 30°41'12" L	329741.532	1078173.657
PT	71+81.78			330786.031	1078087.390
		TL= 1132.99	N 4°43'17" W		
PC	83+14.78			331915.181	1077994.131
PI	90+72.96	R = 11459.20	Delta = 7°34'15" R	332670.786	1077931.724
PT	98+28.93			333428.026	1077969.412
		TL= 1267.35	N 2°50'57" E		
PI	110+96.28			334693.811	1078032.410
		TL= 58.49	N 3°23'32" E		
PI	111+54.77			334752.198	1078035.871
		TL= 186.79	N 3°13'11" E		
PI	113+41.56			334938.696	1078046.362
		TL= 21.73	N 3°11'30" E		
PI	113+63.29			334960.395	1078047.572
		TL= 3446.18	N 2°39'28" E		
PI	148+09.48			338402.871	1078207.370
		TL= 48.51	N 2°16'15" E		
PI	148+57.98			338451.338	1078209.292
		TL= 1257.46	N 2°27'06" E		
PI	161+15.44			339707.642	1078263.082
		TL= 2918.49	N 2°26'00" E		
POE	190+33.92			342623.497	1078386.987

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011); epoch 2010.00; Geoid 12A; SF = 0.9998227882.
The elevations shown on this sheet are based on NAVD 88.

HORIZONTAL ALIGNMENT DATA

Southbound Right Turn

Type	Station			Northing	Easting
POB	0+00.00			326579.145	1076412.649
		TL= 75.80	S 89°15'44" E		
PC	0+75.80			326578.169	1076488.444
PI	2+60.61	R = 250.00	Delta = 72°56'41" L	326575.789	1076673.233
PRC	3+94.08			326751.753	1076729.705
PI	6+61.04	R = 3838.00	Delta = 7°57'27" R	327005.937	1076811.280
PT	9+27.13			327246.380	1076927.258

Outlet Channel at Sta. 17+45 Rt

Type	Station			Northing	Easting
POB	0+00.00			325642.538	1076579.835
		TL= 49.04	S 89°33'48" E		
PC	0+49.04			325642.165	1076628.874
PI	0+60.40	R = 50.00	Delta = 25°35'31" L	325642.078	1076640.230
PT	0+71.37			325646.905	1076650.509
		TL= 0.02	N 64°50'41" E		
PC	0+71.39			325646.912	1076650.524
PI	0+82.44	R = 50.00	Delta = 24°55'25" R	325651.609	1076660.526
PT	0+93.14			325651.654	1076671.576
		TL= 108.65	N 89°46'07" E		
POE	2+01.79			325652.093	1076780.220

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011); epoch 2010.00; Geoid 12A; SF = 0.9998227882.
The elevations shown on this sheet are based on NAVD 88.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B13	B50

CONTROL DATA

POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION
BNCHMK	2240	327794.301	1077197.763	2774.26
BNCHMK	2328	327610.507	1077152.571	2773.66
REFMRK	AC7910	342182.755	1084809.465	2786.81
REFMRK	CP3	326752.822	1068297.073	2864.73
REFMRK	U360	326451.177	1076125.946	2787.26
REFMRK	TP169	334733.036	1077983.355	2816.61
REFMRK	TP170	334732.985	1077983.348	2816.50

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011); epoch 2010.00; Geoid 12A; SF = 0.9998227882.
The elevations shown on this sheet are based on NAVD 88.

LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B14	B50

Plotting Date: 02/02/2024

- Anchor
- Antenna
- Approach
- Assumed Corner
- Azimuth Marker
- BBQ Grill/ Fireplace
- Bearing Tree
- Bench Mark
- Box Culvert
- Bridge
- Brush/Hedge
- Buildings
- Bulk Tank
- Cattle Guard
- Cemetery
- Centerline
- Cistern
- Clothes Line
- Concrete Symbol
- Control Point
- Creek Edge
- Curb/Gutter
- Curb
- Dam Grade/Dike/Levee
- Deck Edge
- Ditch Block
- Doorway Threshold
- Drainage Profile
- Drop Inlet
- Edge Of Asphalt
- Edge Of Concrete
- Edge Of Gravel
- Edge Of Other
- Edge Of Shoulder
- Electric Transformer/Power Junction Box
- Fence Barbwire
- Fence Chainlink
- Fence Electric
- Fence Miscellaneous
- Fence Rock
- Fence Snow
- Fence Wood
- Fence Woven
- Fire Hydrant
- Flag Pole
- Flower Bed
- Gas Valve Or Meter
- Gas Pump Island
- Grain Bin
- Guardrail
- Gutter
- Guy Pole
- Haystack
- Highway ROW Marker
- Interstate Close Gate
- Iron Pin
- Irrigation Ditch
- Lake Edge
- Lawn Sprinkler
- Mailbox
- Manhole Electric
- Manhole Gas
- Manhole Miscellaneous
- Manhole Sanitary Sewer
- Manhole Storm Sewer
- Manhole Telephone
- Manhole Water
- Merry-Go-Round
- Microwave Radio Tower
- Miscellaneous Line
- Miscellaneous Property Corner
- Miscellaneous Post
- Overhang Or Encroachment
- Overhead Utility Line — OH —
- Parking Meter
- Pedestrian Push Button Pole
- Pipe With End Section
- Pipe With Headwall
- Pipe Without End Section
- Playground Slide
- Playground Swing
- Power And Light Pole
- Power And Telephone Pole
- Power Meter
- Power Pole
- Power Pole And Transformer
- Power Tower Structure
- Propane Tank
- Property Pipe
- Property Pipe With Cap
- Property Stone
- Public Telephone
- Railroad Crossing Signal
- Railroad Milepost Marker
- Railroad Profile
- Railroad ROW Marker
- Railroad Signs
- Railroad Switch
- Railroad Track
- Railroad Trestle
- Rebar
- Rebar With Cap
- Reference Mark
- Retaining Wall
- Riprap
- River Edge
- Rock And Wire Baskets
- Rockpiles
- Satellite Dish
- Septic Tank
- Shrub Tree
- Sidewalk
- Sign Face
- Sign Post
- Slough Or Marsh
- Spring
- Stream Gauge
- Street Marker
- Subsurface Utility Exploration Test Hole
- Telephone Fiber Optics — T/F —
- Telephone Junction Box
- Telephone Pole
- Television Cable Jct Box
- Television Tower
- Test Wells/Bore Holes
- Traffic Sign Double Face
- Traffic Sign One Post
- Traffic Sign Two Post
- Traffic Signal
- Trash Barrel
- Tree Belt
- Tree Coniferous
- Tree Deciduous
- Tree Stumps
- Triangulation Station
- Underground Electric Line — P —
- Underground Gas Line — G —
- Underground High Pressure Gas Line — HG —
- Underground Sanitary Sewer — S —
- Underground Storm Sewer — S —
- Underground Tank
- Underground Telephone Line — T —
- Underground Television Cable — TV —
- Underground Water Line — W —
- Water Fountain
- Water Hydrant
- Water Meter
- Water Tower
- Water Valve
- Water Well
- Weir Rock
- Windmill
- Wingwall
- Witness Corner

- State and National Line
- County Line
- Section Line
- Quarter Line
- Sixteenth Line
- Property Line
- Construction Line
- ROW Line
- New ROW Line
- Cut and Fill Limits
- Control of Access
- New Control of Access
- Proposed ROW (After Property Disposal)

- Drainage Arrow

- Remove Concrete Pavement
- Remove Concrete Driveway Pavement
- Remove Asphalt Concrete Pavement
- Remove Concrete Sidewalk
- Remove Concrete Median Pavement
- Remove Concrete Curb and/or Gutter

- Detectable Warning
- Pedestrian Push Button Pole and 30" x 48" Clear Space with 1.5% slope

Plot Scale - 1:200

Plotted From - TRRC11626

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B15	B50

Plotting Date: 07/02/2024 Revised 6/20/2024

293+14-65' L
Take Out Headwalls & 18"-12' CMP
near fence line
(Incidental Work, Grading)

293+55 L & R
Shape Inlet & Outlet Ditches to ROW
(Incidental Work, Grading)

293+55 L
Take Out 18" RCP Flared End

293+55 L
Install 18" RCP Flared End

293+55 L
Install PVC Coated Bank and Channel
Protection Gabions (4.5 CuYd)
and Type B Drainage Fabric (15 SqYd)

297+34-40' L
Take Out Headwall L & 18"-80' CMP
(Incidental Work, Grading)

297+34
Install 24"-138' RCP
& 2 Flared Ends

314+98
Take Out Headwall R & 18"-68' CMP
(Incidental Work, Grading)

314+98
Install 24"-138' RCP
& 2 Flared Ends

321+89
Pipe Cleanout

321+89 L & R
Take Out 2-18" CMP
Flared End Sections

321+89
Retain 18"-60' CMP

321+89 L
Install 18"-40' CMP
& 18" CMP Flared End

321+89 R
Install 18"-40' CMP
& 18" CMP Flared End

Sec 6 - T8N - R6E

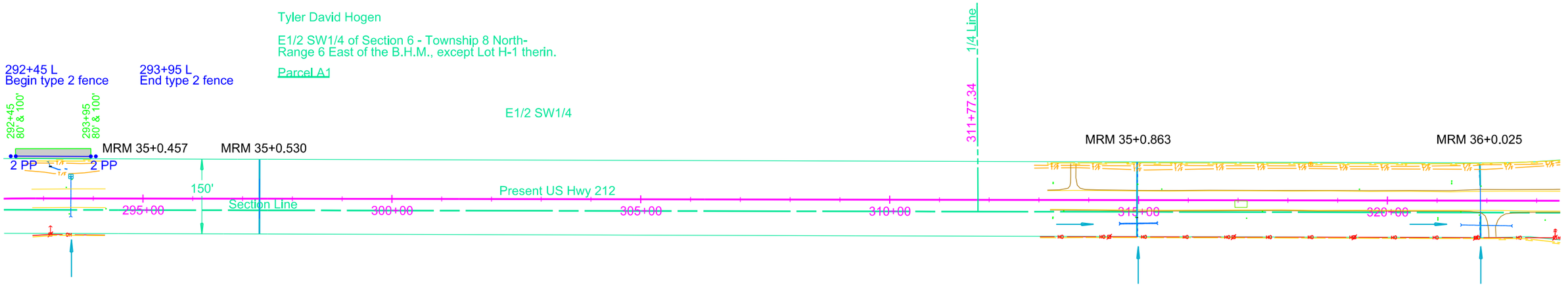
Tyler David Hogen

E1/2 SW1/4 of Section 6 - Township 8 North-
Range 6 East of the B.H.M., except Lot H-1 therin.

Parcel A1

292+45 L
Begin type 2 fence

293+95 L
End type 2 fence



314+98 R
Do Not Disturb
Twin Approach Pipe

321+89 R
Do Not Disturb
Approach Pipe

Sec 7 - T8N - R6E

Parcel A1
292+45 to 293+95 L
Temporary easement containing
0.1 ac, more or less

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B16	B50

Plotting Date: 04/15/2024 Revised 4/15/2024 NJF

MRM 129.71+0.06

12+10
Take Out 24"-20' CMP
& End Sections L & R
(Incidental Work, Grading)

12+10
Install 24"-164' CIPP Liner
& 2-24" CMP Flared Ends

12+10 R
Fill Void in Inslope (±5 CuYd)
(Incidental Work, Grading)

12+10 R
Install PVC Coated Bank and Channel
Protection Gabions (4.5 CuYd)
& Type B Drainage Fabric (15 SqYd)

MRM 129.71+0.163

17+45-115' L
Take Out 24"-78' CMP
& End Sections
(Incidental Work, Grading)

17+45
Take Out 24"-220' CMP
& Elbows and End Sections
(Incidental Work, Grading)

17+45
Install 24"-90' RCP
& Flared Ends

17+45-55' R to 17+55-180' R
Install Articulated Concrete Mattress
(See Section D)

MRM 130+0.022

23+04-226' to 96' L
Take Out 42"-140' CMP
w/Slipliner & End Section
(Incidental Work, Grading)

23+04
Retain 42"-228' CMP
w/Slipliner, Elbows, &
End Section

23+04-86' L
Install 42" CMP Flared End

MRM 130.02+0.025

25+44
Take Out 18"-92' RCP
& End Sections
(Incidental Work, Grading)

328+35-30' R to 331+45-380' R (SD79/US212)
Obliterate Roadway (5 Sta)

MRM 129+0.630 L
Do Not Disturb
Automatic Traffic Recording Site

Sec. 7 - T8N - R6E

Rodney Alexander

NE1/4 of Section 7 - Township 8 North - Range 6 East of the B.H.M., except Tracts A, B and C, and except Lots H-1, H-2, H-3, H-4, H-5 and H-6 therein.

Parcel A2

NE1/4

9+40-30' L to 26+00-130' L (SD79)
Obliterate Roadway (17 Sta)

BEGIN GRADING NH-P-PH 0079(87)129
Station 5+82

17+18
End type 4 fence
17+18.00
205.00'
2 PP

R.O.W. Line

10+00
Begin type 4 fence
2 PP
10+00.00
175.94'

12+00.00
117.00'

Present SD Hwy 79

Present US Hwy 212

5+82
150'
10+00
15+00
20+00
25+00
330+00
33'
33'

2 PP
13+70.00
82.90' & 86.00'

13+70
Begin type 4 fence

17+30
End type 4 fence
17+30.03
83.71' & 95.00'

2 PP
19+80.00
84.22' & 91.00'

19+80
Begin type 4 fence

22+89
End type 4 fence
22+88.90
84.81' & 97.00'

2-2 PP
23+40.21
84.90' & 91.00'

23+40
Begin type 4 fence

26+18.65
85.36'
26+19.78
91.00'

2 PP

26+19
End type 4 fence

Tract B
SE1/4NE1/4

1/16 Line

Tract A
NE1/4NE1/4

SD79
PI 23+16.33
N 326187.66
E 1076342.40
Del 41°53'50" R
Dc 1°30'00"
T 1462.43'
L 2793.36'
R 3820.00'

Charles L. Hutchason

Tract A in the NE1/4NE1/4 of Section 7 - Township 8 North - Range 6 East of the B.H.M., except Lot H-1 therein.

Parcel A3

Section Line

Parcel A2
10+00.00 to 17+18.00 L
Temporary easement containing
0.3 ac, more or less

Parcel A3
13+70.00 to 17+30.03 L
Temporary easement containing
0.1 ac, more or less

Parcel A3
19+80.00 to 22+88.90 L
Temporary easement containing
0.1 ac, more or less

Parcel A3
23+40.21 to 26+19.78 L
Temporary easement containing
0.1 ac, more or less

Obliterate Road

Plot Scale - 1:150

Plotted From - trrc11626

File - ...\pn\Bute06CP\PlanSheet1.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B17	B50

Plotting Date: 02/02/2024

Plot Scale - 1:200

Plotted From - TRRC11626

File - ...\Profile_79and212_1.dgn

5+82
Begin Work

PVI 5+82
Elev 2806.02

-1.52%

18+00 L
40' Ent

26+41 L
Int Rd (US Hwy 212)

26+59 R
24' Ent

PVI 28+95
Elev 2770.81

L 1000.00ft
G1 -1.52%
G2 0.04%
K 640

Exc=	5,295	Emb=	9,358	
Undercut=	13,356	+35%	3,275	12,633
Borrow=	12,013	Undercut=	13,356	
Total=	30,664	+35%	4,675	18,031
		Total=	30,664	

Channel Profile at Sta. 17+45 Rt

0+00 5+00

PVI 0+46
Elev 2779.94

PVI 0+78
Elev 2774.61

-16.50%

PVI 1+08
Elev 2765.77

-30.03%

PVI 1+41
Elev 2754.17

-34.96%

PVI 1+74
Elev 2748.10

-18.28%

2768.13

0+00 5+00

2900 2890 2880 2870 2860 2850 2840 2830 2820 2810 2800 2790 2780 2770 2760 2750 2740 2730 2720

2805.74 2804.22 2802.70 2801.18 2799.65 2798.13 2796.61 2795.09 2793.56 2792.04 2790.52 2789.00 2787.48 2785.95 2784.43 2782.91 2781.39 2779.86 2778.34 2776.91 2775.63 2774.50 2773.54 2772.72 2772.07

5+82 10+00 15+00 20+00 25+00 30+00

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B18	B50

Plotting Date: 02/05/2024 Revised 6-23-2023 NJF

MRM 130.02+0.025

25+60 L
Take Out 18"-70' CMP
& End Sections
(Incidental Work, Grading)

MRM 36.19+0.022

27+45
Take Out 18"-73' CMP
& End Sections
(Incidental Work, Grading)

MRM 35.97+0.068

28+78
Take Out 18"-82' RCP
& End Sections
(Incidental Work, Grading)

27+45-93.00' L to 37.73' L
Install 24"-50' RCP
(Between Inlet & Median Drain)

27+45-37.73' L
Install Type M Median Drain
with Type M Frame and Grate

27+45-37.73' L to 50.37' R
Install 24"-82' RCP
(Between Median Drain & Outlet)

Install 24" RCP Flared Ends
at the following locations:
27+45-93' L
27+45-50.37' R

28+85-570' L to 32+00-35' L (SD79)
Obliterate Roadway (8 Sta)

BEGIN Grading US212
Station 324+00

BEGIN SB Right Turn Lane
Station 1+00

END Grading US212
Station 332+78

END SB Right Turn Lane
Station 5+00

END GRADING
NH-P-PH 0079(87)129
Station 37+00

US212
PI 327+43.06
N 326576.16
E 1076129.89
Del 3°33'01" L
Dc 0°53'03"
T 200.83'
L 401.54'
R 6480.00'

US212
PI 330+96.60
N 326582.09
E 1076483.51
Del 14°49'29" R
Dc 5°43'46"
T 130.10'
L 258.74'
R 1000.00'

SB Right Turn
PI 2+60.61
N 326575.79
E 1076673.23
Del 72°56'41" L
Dc 22°55'06"
T 184.80'
L 318.28'
R 250.00'

SB Right Turn
PI 6+61.04
N 327005.94
E 1076811.28
Del 7°57'27" R
Dc 1°29'34"
T 266.95'
L 533.05'
R 3838.00'

Sec. 6 - T8N - R6E

Bruce L. Gotfredson and Wava C. Gotfredson

E1/2SE1/4 of Section 6 - Township 8 North - Range 6 East
of the B.H.M., except Lots H-1, H-2, H-3, H-4 and H-5 therein.

Parcel A4
OMITTED

E1/2SE1/4

Present US Hwy 212

Present SD Hwy 79/US Hwy 212

R.O.W. Line

R.O.W. Line

Section Line

Section Line

Horse Creek

E1/2SE1/4

SD79
PI 36+95.19
N 327507.00
E 1077077.64
Del 2°34'17" L

325+00

330+00

25+00

30+00

35+00

40+00

40+85.91

150'

Obliterate Road

Plot Scale - 1:150

Plotted From - TPRC11626

File - ...\prj\Butte66CPNPlanSheet1.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B19	B50

Plotting Date: 02/02/2024

Plot Scale - 1:200

SD79 & US212

End Work

33+79 R
24' End

L 1000.00ft
G1 -1.52%
G2 0.04%
K 640

PVI 37+00
Elev 2771.13

PVI 38+08
Elev 2771.18

0.04%

0.04%

2772.07 2771.57 2771.23 2771.04 2771.01 2771.05 2771.09 2771.13 2771.17

30+00 35+00 40+00

Southbound Right Turn

1+00
Begin Work

5+00
End Work

Exc= 2,165 Emb= 483
Undercut= 855 35% 169 652
Total= 3,020 Undercut= 855
35% 299 1,154
Waste 1,214 1,214
Total= 3,020

Waste is excess material to be disposed of at a site approved by the Engineer.

PVI 0+00
Elev 2779.73

PVI 0+25
Elev 2779.01

PVI 0+50
Elev 2778.35

PVI 1+52
Elev 2775.93

PVI 3+94
Elev 2773.76

PVI 4+30
Elev 2773.47

PVI 5+00
Elev 2772.98

PVI 6+00
Elev 2772.40

PVI 7+00
Elev 2771.98

PVI 8+00
Elev 2771.71

PVI 9+27
Elev 2771.60

-2.88% -2.38% -2.64% -0.90% -0.80% -0.70% -0.58% -0.42% -0.27% -0.09%

L 150.00ft
G1 -2.38%
G2 -0.90%
K 101

2800 2790 2780 2770 2760 2750

0+00 5+00 10+00

US 212

324+00
Begin Work

332+78
End Work

Exc= 4,545 Emb= 100
Undercut= 4,133 35% 35 135
Total= 8,678 Undercut= 4,133
35% 1,447 5,580
Waste 2,963 2,963
Total= 8,678

Waste is excess material to be disposed of at a site approved by the Engineer.

PVI 324+00
Elev 2794.46

PVI 327+32
Elev 2788.03

PVI 331+41
Elev 2776.49

PVI 333+09
Elev 2776.34

-1.9365% -2.8249% -0.0865%

L 400.00ft
G1 -1.9365%
G2 -2.8249%
K 450

L 200.00ft
G1 -2.8249%
G2 -0.0865%
K 73

2820 2810 2800 2790 2780 2770 2760

320+00 325+00 330+00 333+09

File - ...\Profile_79and212_2.dgn

TRRC11626

Plotted From -

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B20	B50

Plotting Date: 02/02/2024

111+23
Retain 18"-60' RCP
& 2 Flared Ends

111+23 L
Ditch Shaping (10'x20')
(Incidental Work, Grading)

Sec 31 - T9N - R6E

130+77.66

MRM 37+0.795

Section Line

105+00

150'

110+00

115+00

125'

Present US Hwy 212 & SD 79

120+00

125+00

100'

130+00

Sec 32 - T9N - R6E

Section Line

148+34
Retain 24"-84' RCP
& 2 Flared Ends

Sec 30 - T9N - R6E

130+77.66

157+73.61

First Street

55'

MRM 38+0.499

Section Line

100'

Present US Hwy 212 & SD 79

135+00

140+00

145+00

150+00

155+00

80'

160+00

Lot 1
BLOCK 28
ORIGINAL
TOWNSITE

Townsite Lateral

BLOCK 28
ORIGINAL
TOWNSITE

Lot 7
Lot 6
Lot 5
Lot 4
Lot 3
Lot 2
20' Alley

1/4 Line

55'

First Street

Sec 29 - T9N - R6E

Section Line

Plot Scale - 1:200

Plotted From - TRRC11626

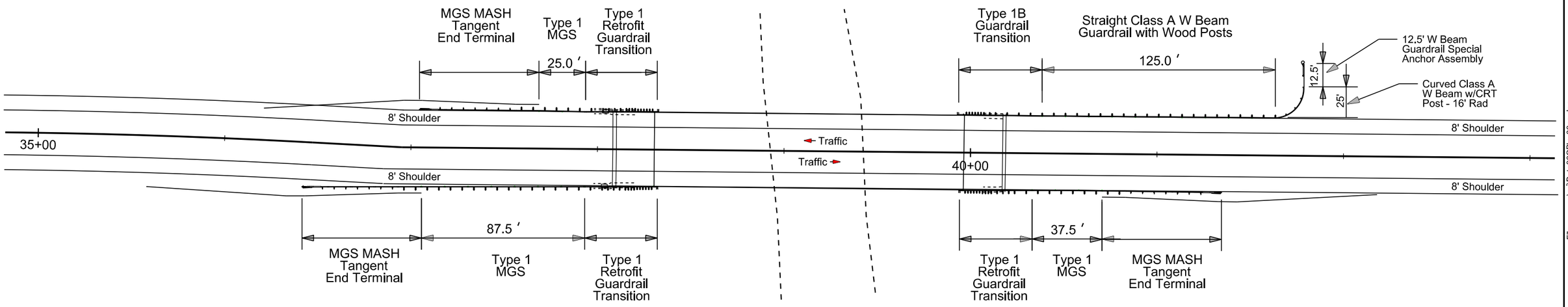
File - ...\Bute06CP\DualPlanSheet2.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B21	B50

Plotting Date: 02/02/2024

GUARDRAIL LAYOUT

Str. No. 10-309-368 (MRM 36.42)



Plot Scale - 1:52.8

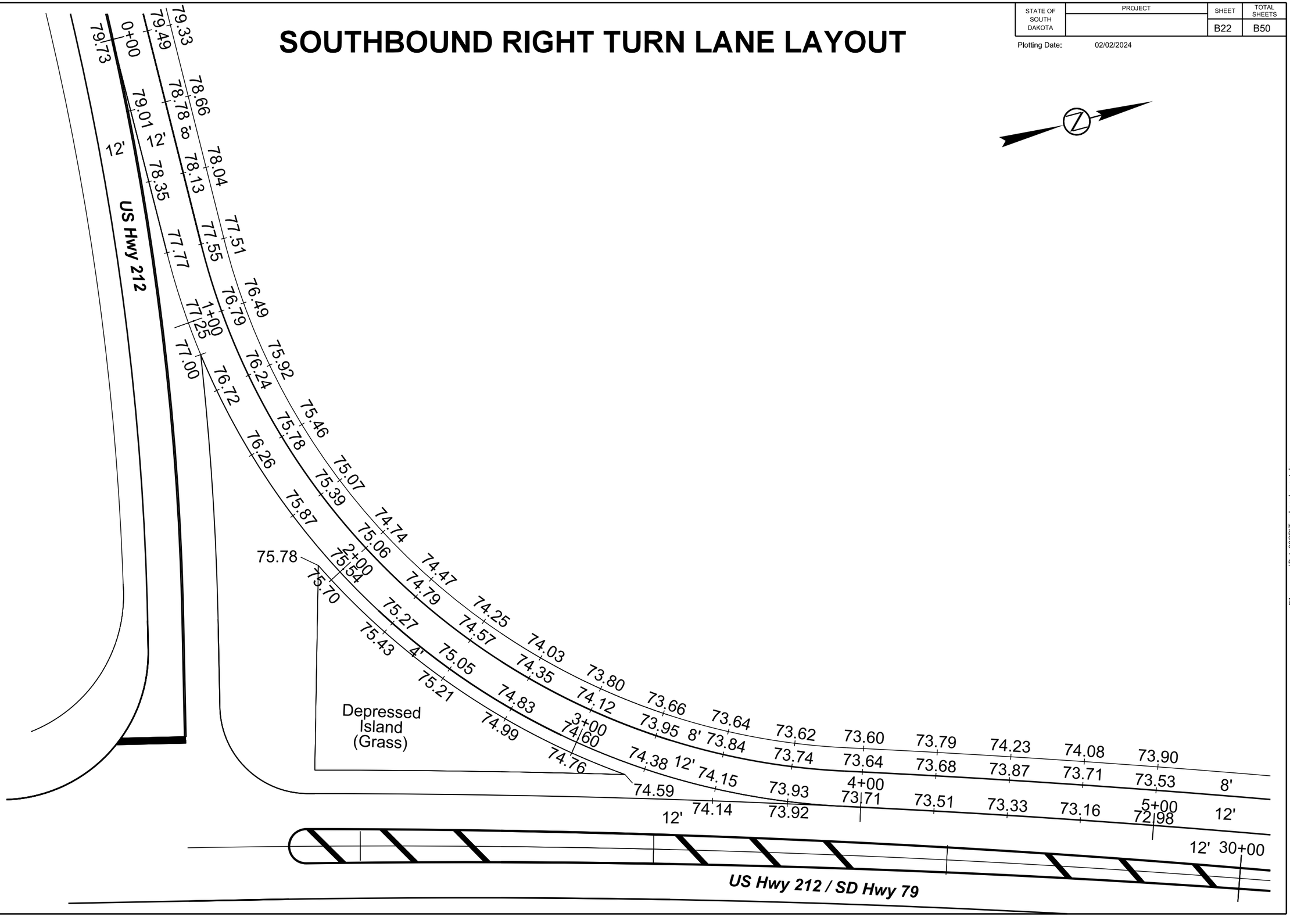
Plotted From - TRRC11626

File - ...\prj\But06CP\gr06cp.dgn

SOUTHBOUND RIGHT TURN LANE LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		B22	B50

Plotting Date: 02/02/2024



Plot Scale - 1:30

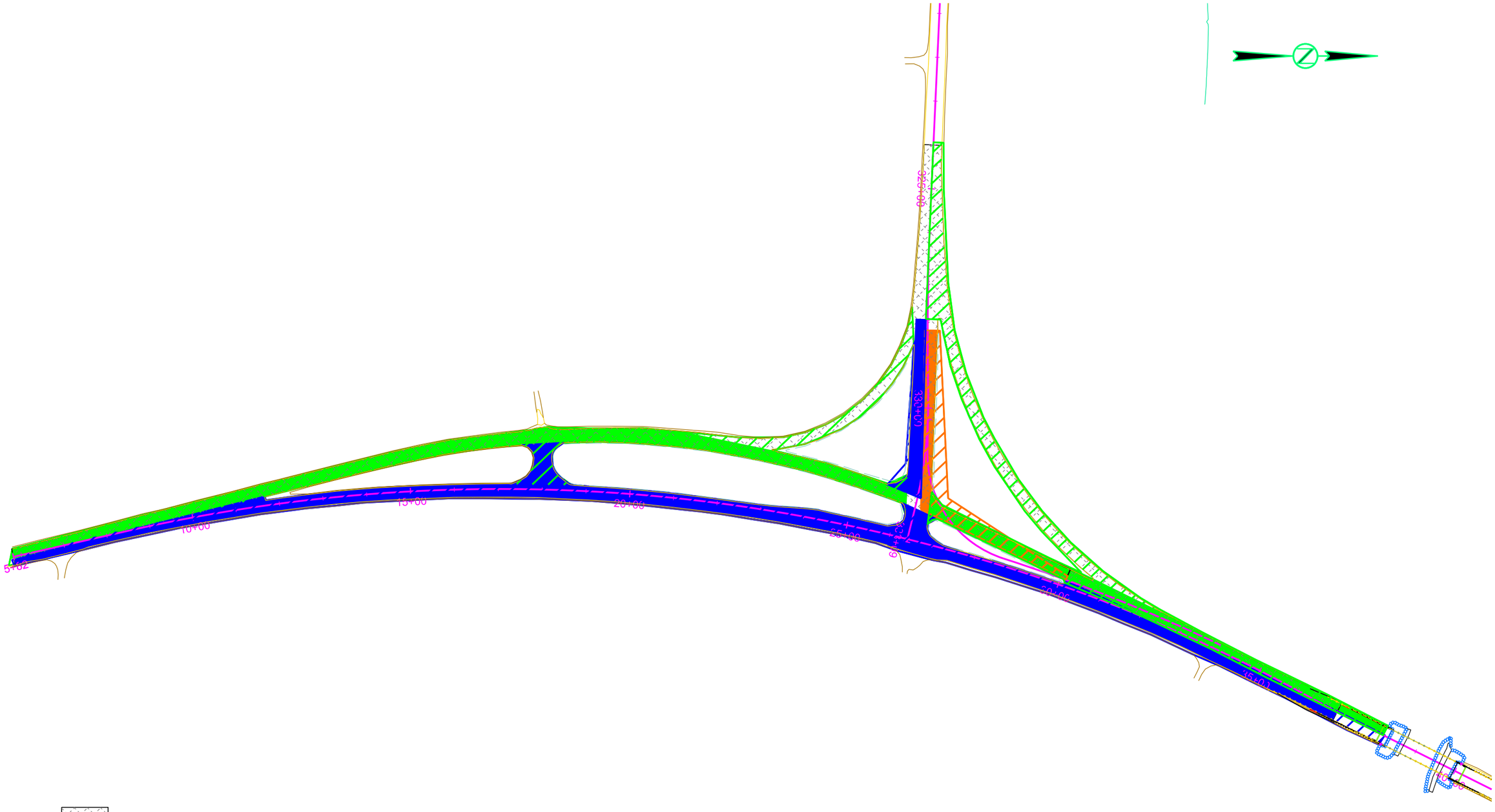
Plotted From - TRRC11626

File - ...\Bute06CP\TurnLaneLayout.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B23	B50

Plotting Date: 02/02/2024

PAVEMENT REMOVAL LAYOUT



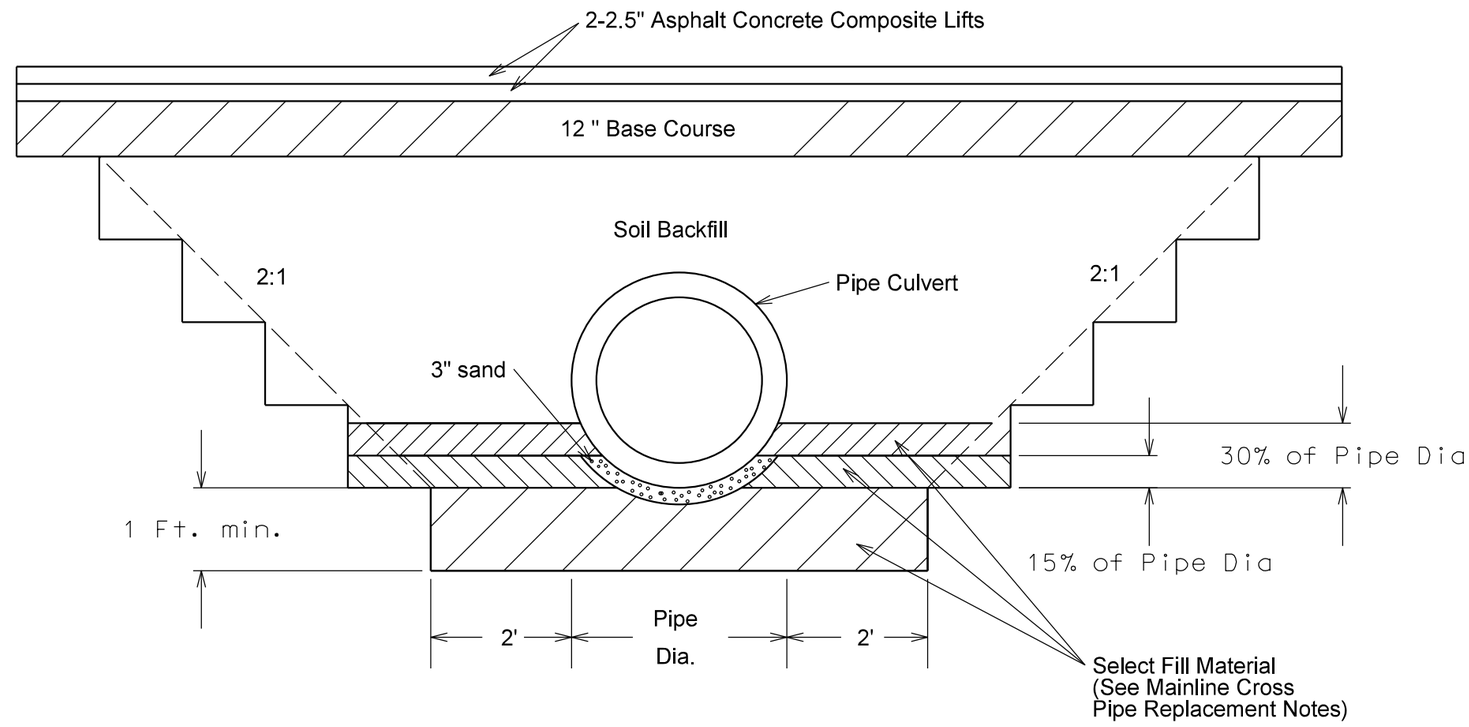
Salvage and Stockpile Asphalt Mix and Granular Base Material

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B24	B50

Plotting Date: 02/02/2024 Revised 1/13/2022 NJF

PIPE REPLACEMENT DETAIL

PCN 06CP
MRM 35+0.863 (Sta. 314+98)
MRM 36+0.025 (Sta. 321+89)



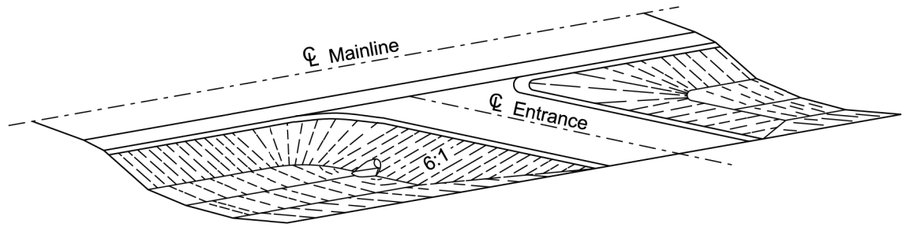
Plot Scale - 1:3

Plotted From - TRRC11626

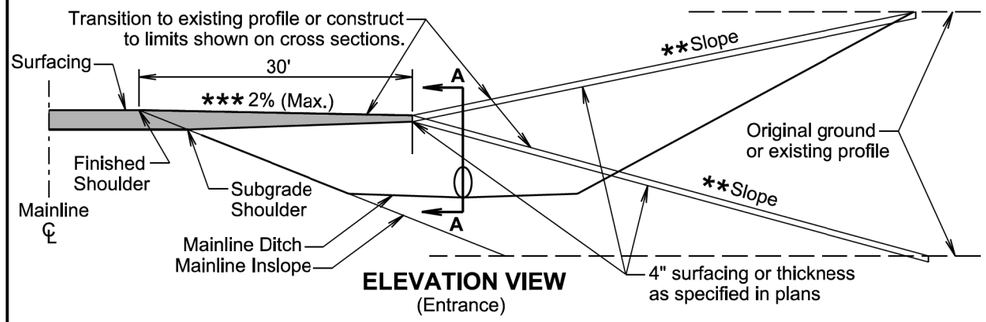
File - ...\Pipe Replacement detail.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B25	B50

Plotting Date: 02/02/2024



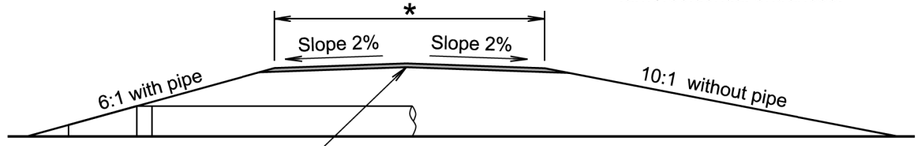
PERSPECTIVE OF ENTRANCE



ELEVATION VIEW
(Entrance)

*** 2% When on the inside of superelevation and 0% or flat when on outside of superelevation.

** Entrance maximum slope is typically 10:1 for field entrances and 15:1 for farm/residential entrances.



SECTION A-A
(Entrance and Intersecting Road)

* The finished surfacing width is stated elsewhere in the plans. The subgrade width is 4' wider than the finished surfacing width unless stated otherwise in the plans.

GENERAL NOTES:

The ditch section shown above in the perspective view is only for illustrative purpose.

The elevation view above is typical for either a ditch cut or fill section. Entrances that vary from above should be specified in the plans.

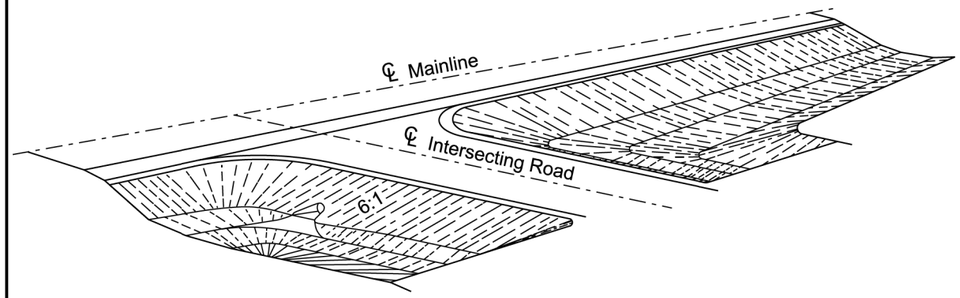
Pipe length will be adjusted if necessary during construction to obtain the 6:1 slope. For grading projects, the pipe length is estimated typically using a 4" thickness of surfacing directly over the subgrade above the pipe.

The transition area between the mainline inslope and the entrance or intersecting road inslope will be rounded to eliminate an abrupt transition.

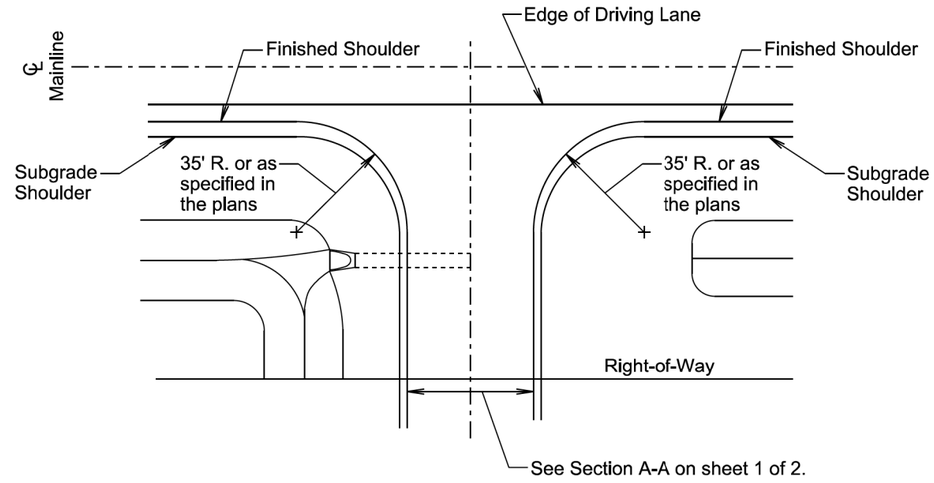
The turning radii will be 35' for intersecting roads and entrances unless stated otherwise in the plans.

November 19, 2021

Published Date: 2024	SDDOT	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER 120.01
			Sheet 1 of 2



PERSPECTIVE OF INTERSECTING ROAD



PLAN VIEW

GENERAL NOTES:

The 6:1 or 10:1 intersecting road inslope will transition to the existing intersecting road inslope near the right-of-way or at a location as determined by the Engineer.

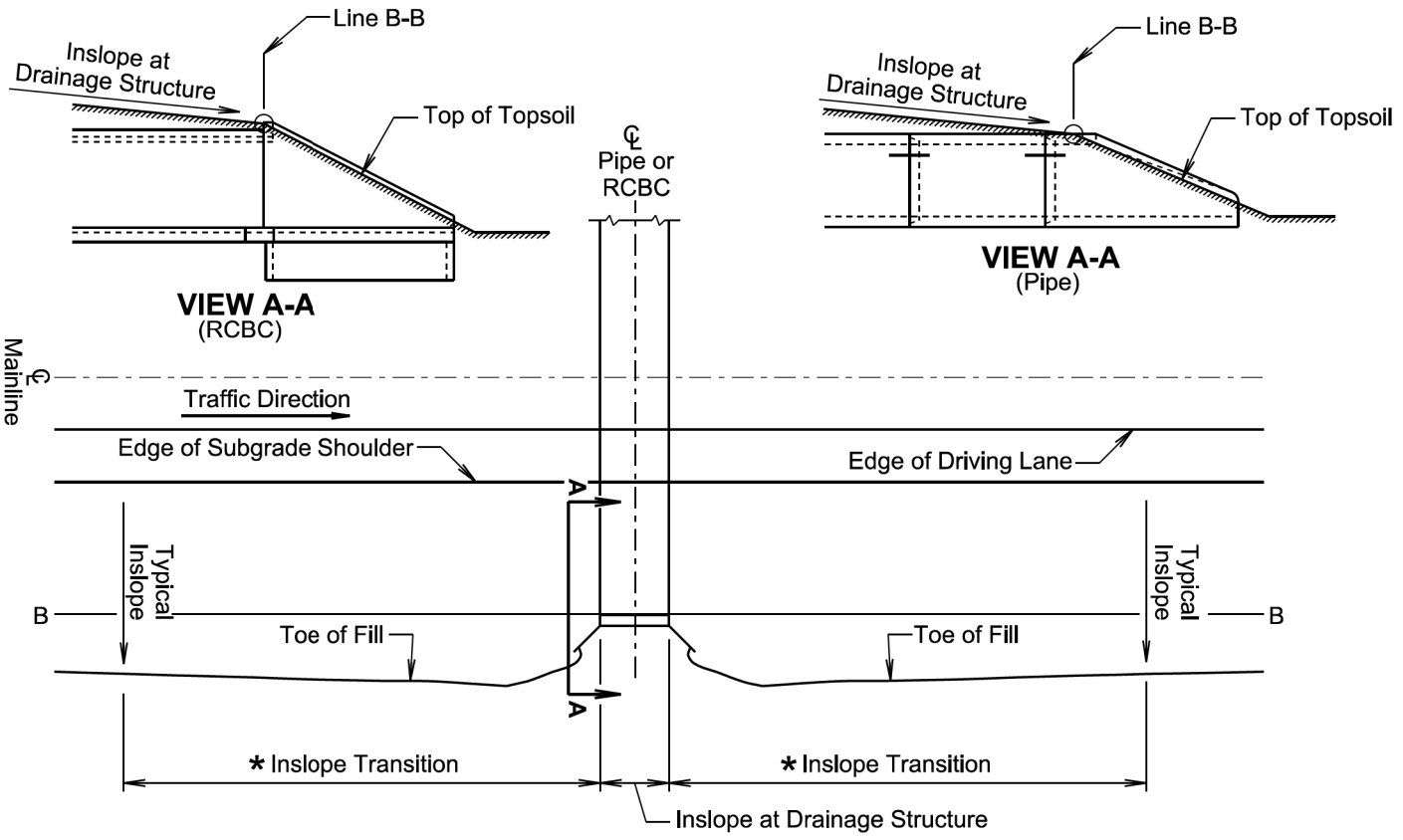
November 19, 2021

Published Date: 2024	SDDOT	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER 120.01
			Sheet 2 of 2

Plot Scale - 1:200

Plotted From - TRRC11626

File - ...\SectionB_StandardPlates.dgn



TYPE 1 INSLOPE TRANSITION

GENERAL NOTES:

This Type 1 Inslope Transition is used when the specified inslope at the drainage structure is flatter than the typical inslope and the inslope at the drainage structure is between a 4:1 slope and 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

* Transition from the typical inslope to the inslope at the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned gradually to the slope necessary adjacent to the RCBC wing wall or pipe culvert end section within the transition length necessary for the transition within the clear zone.

Published Date: 2024

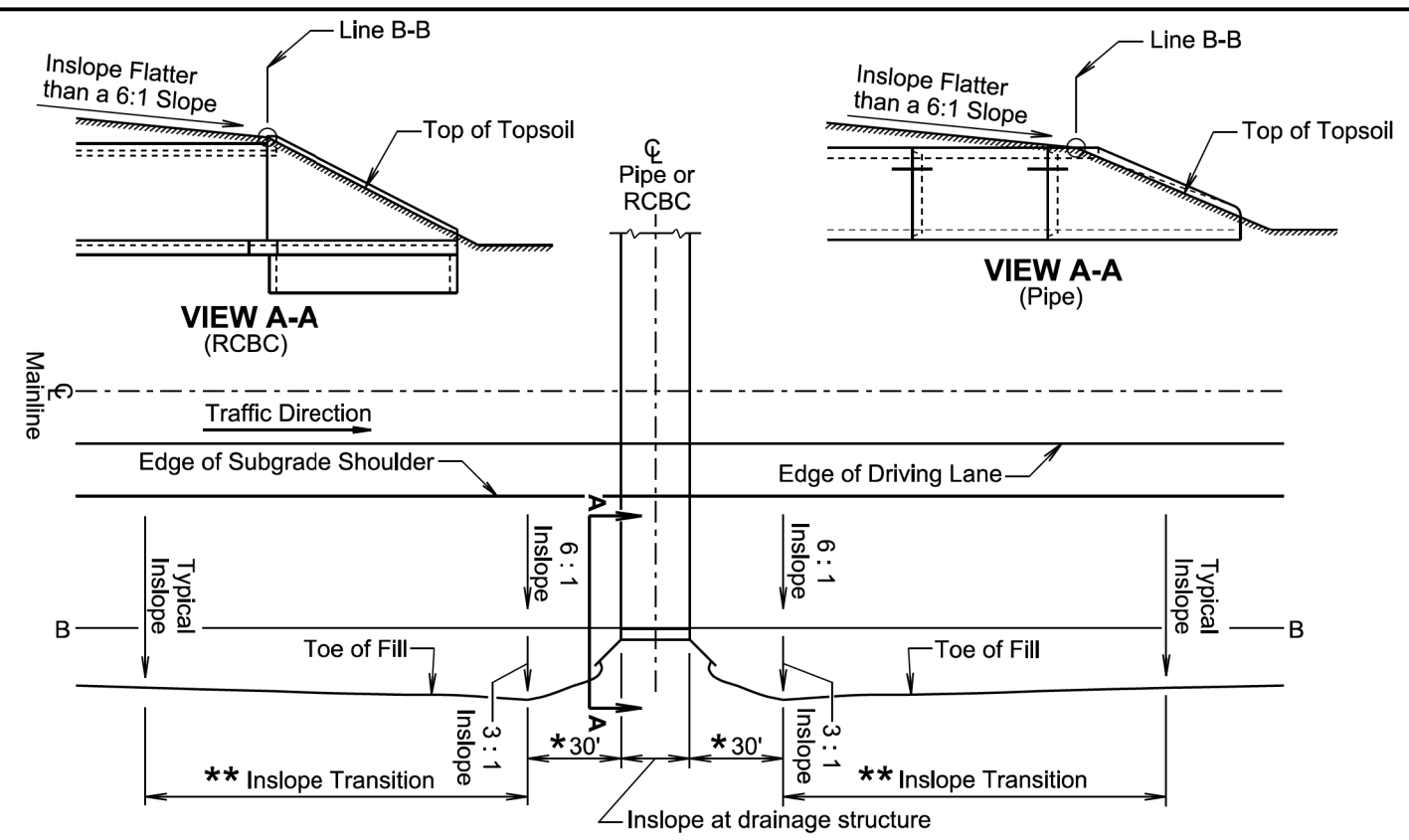
SDDOT

INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS

PLATE NUMBER 120.05

Sheet 1 of 2

September 14, 2018



TYPE 2 INSLOPE TRANSITION

GENERAL NOTES:

This Type 2 Inslope Transition is used when the specified inslope at the pipe or RCBC is flatter than a 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

* Transition from Inslope at drainage structure to a 6 : 1 inslope and 3:1 inslope.

** Transition from typical inslope to the inslopes adjacent to the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned to a 3:1 inslope within the transition length necessary for the transition within the clear zone.

Published Date: 2024

SDDOT

INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS

PLATE NUMBER 120.05

Sheet 2 of 2

September 14, 2018

Plotting Date: 02/02/2024

STATE OF SOUTH DAKOTA

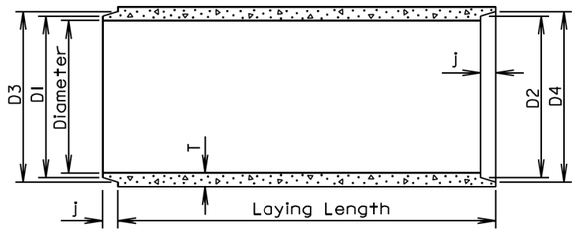
PROJECT NH-P-PH 0079(87)129 NH 0212(193)28

SHEET B26

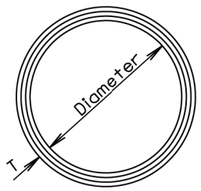
TOTAL SHEETS B50

TOLERANCES IN DIMENSIONS

Diameter: ±1.5% for 24" Dia. or less and ±1% or 3/8" whichever is more for 27" Dia. or greater.
Diameters at joints: ± 3/16" for 30" Dia. or less and ± 1/4" for 36" or greater.
Length of joint (j): ± 1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

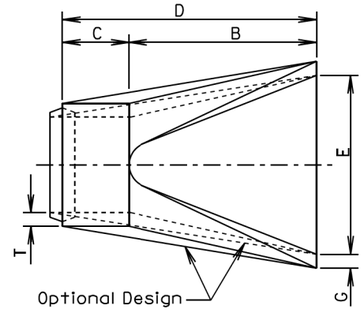
Construction of R. C. P. shall conform to the requirements of Section 990 of the Specifications.

Not more than 2 four-foot sections shall be permitted near the ends of any culvert. Four-foot lengths shall be used only to secure the required length of culvert.

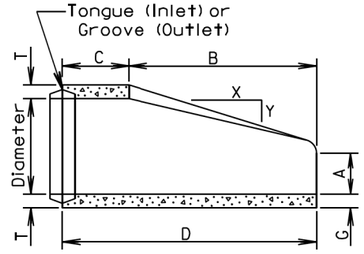
Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 7/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

June 26, 2015

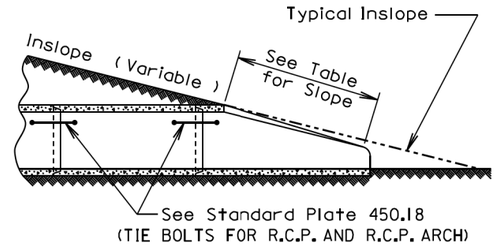
Published Date: 2024	SDDOT	REINFORCED CONCRETE PIPE	PLATE NUMBER 450.01
			Sheet 1 of 1



TOP VIEW



LONGITUDINAL SECTION

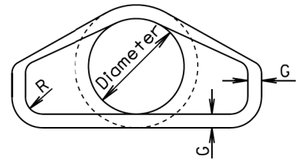


SLOPE DETAIL

GENERAL NOTES:

Lengths of concrete pipe shown on plan sheets are between flared ends only.

Construction of R.C.P. Flared End shall conform to the requirements of Section 990 of the Specifications.



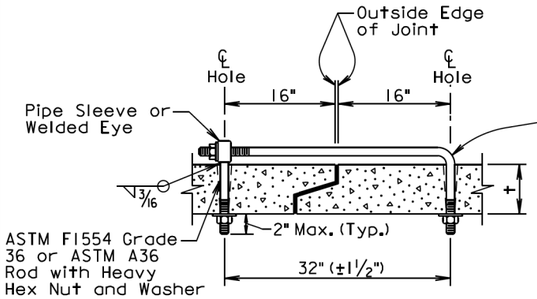
END VIEW

Dia. (in.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	R (in.)
12	530	2.4: 1	2	4	24	48 7/8	72 7/8	24	2	1 1/2
15	740	2.4: 1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3: 1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4: 1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5: 1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5: 1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5: 1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5: 1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5: 1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5: 1	5	24	72	26	98	84	5	1 1/2
54	8240	2: 1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9: 1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7: 1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8: 1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8: 1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6: 1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5: 1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

June 26, 2015

Published Date: 2024	SDDOT	R. C. P. FLARED ENDS	PLATE NUMBER 450.10
			Sheet 1 of 1

Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3¼	⅝	¾
3½-6½	¾	1
≥ 7	1	1¼



ADJUSTABLE EYE BOLT TIE

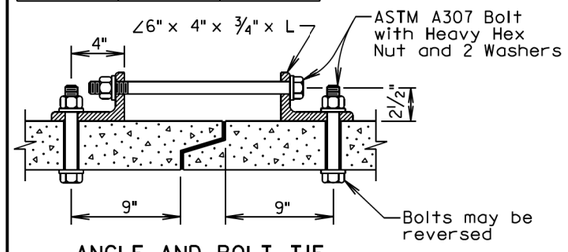
GENERAL NOTES:

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustible eye bolt tie assembly in accordance with ASTM A153.

Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	¾
> 48	6	1



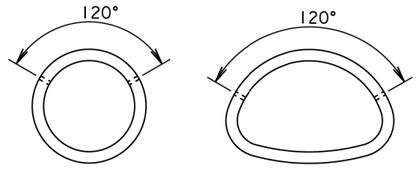
ANGLE AND BOLT TIE

GENERAL NOTES:

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



END VIEW "CIRCULAR"

END VIEW "ARCH"

GENERAL NOTES:

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

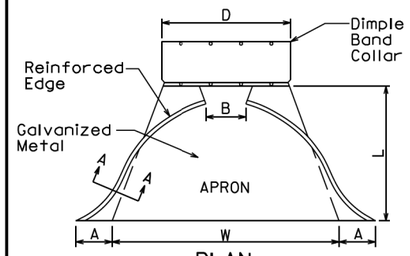
All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.

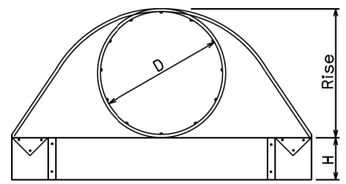
February 28, 2013

Published Date: 2024	SDDOT	TIE BOLTS FOR R.C.P. AND R.C.P. ARCH	PLATE NUMBER 450.18
			Sheet 1 of 1

Alternate Type Connector Sections may be used with approval of the Engineer.



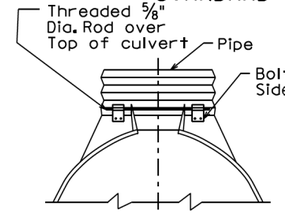
PLAN



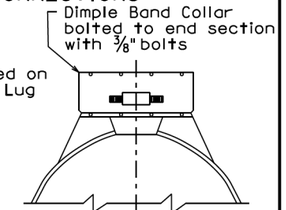
ELEVATION

Dia. D (in.)	Ga.	DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
12	16	6	6	6	21	24	2½:1	1 Pc.
15	16	7	8	6	26	30	2½:1	1 Pc.
18	16	8	10	6	31	36	2½:1	1 Pc.
21	16	9	12	6	36	42	2½:1	1 Pc.
24	16	10	13	6	41	48	2½:1	1 Pc.
30	14	12	16	8	46	60	2½:1	1 Pc.
36	14	14	19	9	51	72	2½:1	2 Pc.
42	12	16	22	11	60	84	2½:1	2 Pc.
48	12	18	27	12	69	90	2¼:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1¾:1	3 Pc.
66	12	18	36	12	87	120	1½:1	3 Pc.
72	12	18	39	12	87	126	1⅓:1	3 Pc.
78	12	18	42	12	87	132	1¼:1	3 Pc.
84	12	18	45	12	87	138	1⅛:1	3 Pc.

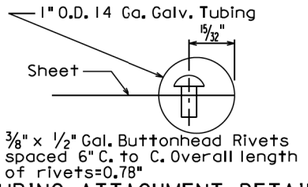
STANDARD CONNECTIONS



For 30" through 84"

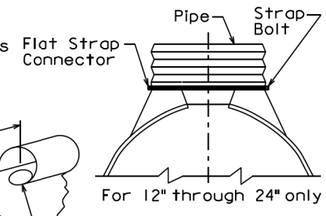


Alternate for all sizes

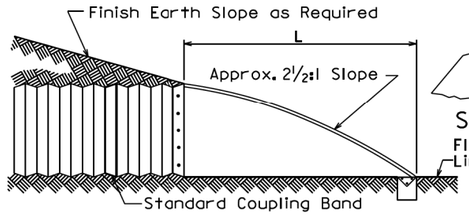


TUBING ATTACHMENT DETAILS SECTION A-A

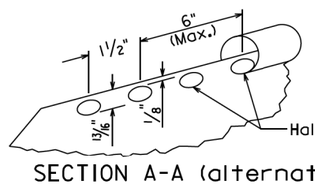
NOTE:
Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.



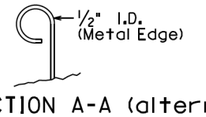
For 12" through 24" only



TYPICAL CROSS-SECTION



SECTION A-A (alternate)



SECTION A-A (alternate)

GENERAL NOTES:

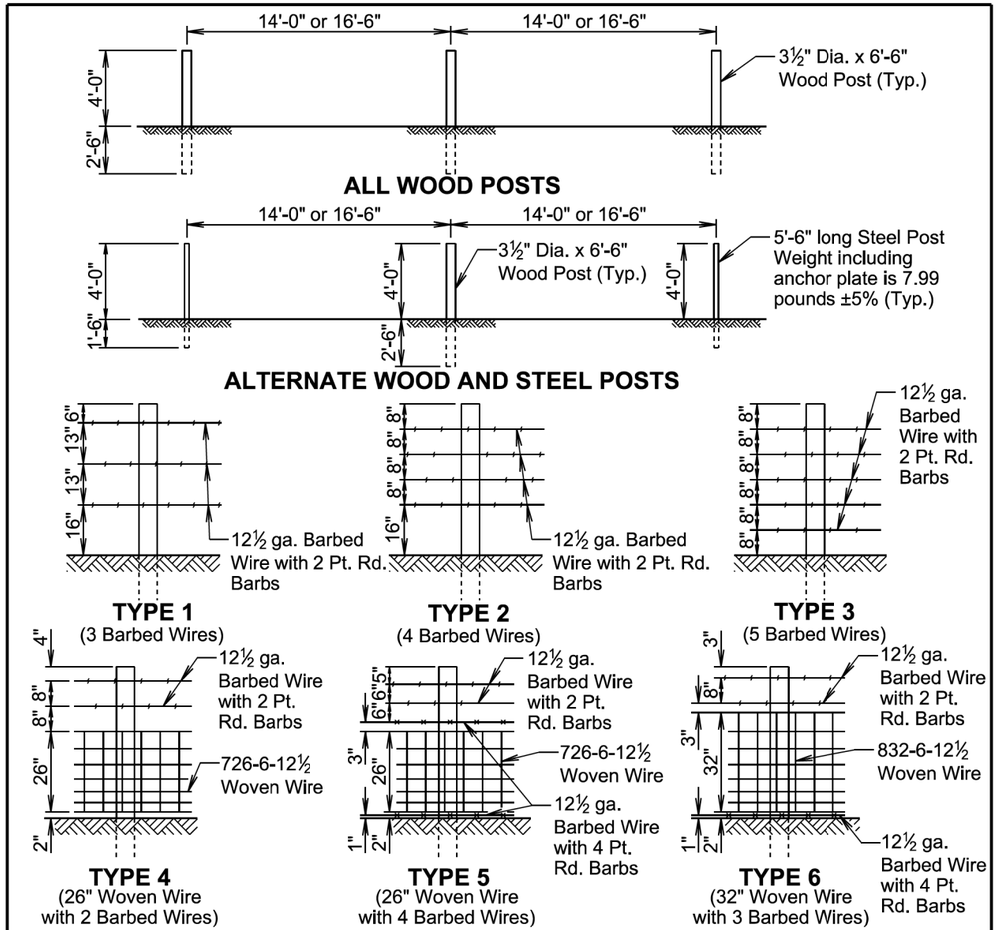
All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by ⅜" Dia. galvanized rivets or bolts.

For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x ¼" for 60" through 72" diameters and 2½" x 2½" x ¼" for 78" and 84" diameters. The angles shall be attached by ⅜" diameter galvanized nuts and bolts.

Rivets and Bolts shall be ⅜" Dia. Min. for 10 Ga. and 12 Ga. sheet, and ⅝" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

March 31, 2000

Published Date: 2024	SDDOT	C.M.P. FLARED ENDS	PLATE NUMBER 450.35
			Sheet 1 of 1



TYPE OF FENCE		LINE POST SPACING	BARBED WIRE		WOVEN WIRE
TYPE	DESCRIPTION		WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.
1	3 Barbed Wires	16'-6"	12½	2 Point Round	—
2	4 Barbed Wires	16'-6"	12½	2 Point Round	—
3	5 Barbed Wires	16'-6"	12½	2 Point Round	—
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12½	2 Point Round	726-6-12½
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 2 wires with 4 Pt. Rd.	726-6-12½
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 1 wire with 4 Pt. Rd.	832-6-12½

GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S will have smooth (barbless) wires.

When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

All degrees of curvature stated for fence are at centerline of roadway.

June 26, 2019

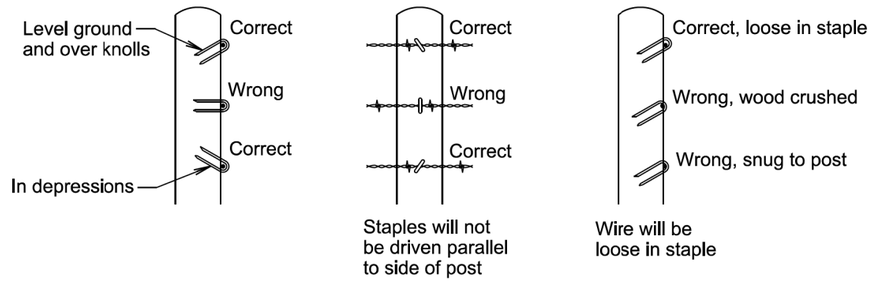
Published Date: 2024

SDDOT

RIGHT-OF-WAY FENCE

PLATE NUMBER 620.01

Sheet 1 of 1



STAPLE INSTALLATION

GENERAL NOTES:

The Right-of-Way fence will consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire will be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts will be used for brace panels. Gates will be of the type designated in the plans or as otherwise directed by the Engineer. Fence will be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.

Right-of-Way fence on Interstate Projects will be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Right-of-Way fence other than on Interstate Projects will be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Barbs will be fabricated from zinc coated 14 ga. wire. Two point barbs will be wrapped twice around one main strand at four-inch spacings and the four point barbs will be interlocked and wrapped around both main strands at five-inch spacings.

The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts will be as stated in AASHTO M281. Woven wire will conform to design and specifications of ASTM A116 and barbed wire will conform to ASTM A121.

June 26, 2019

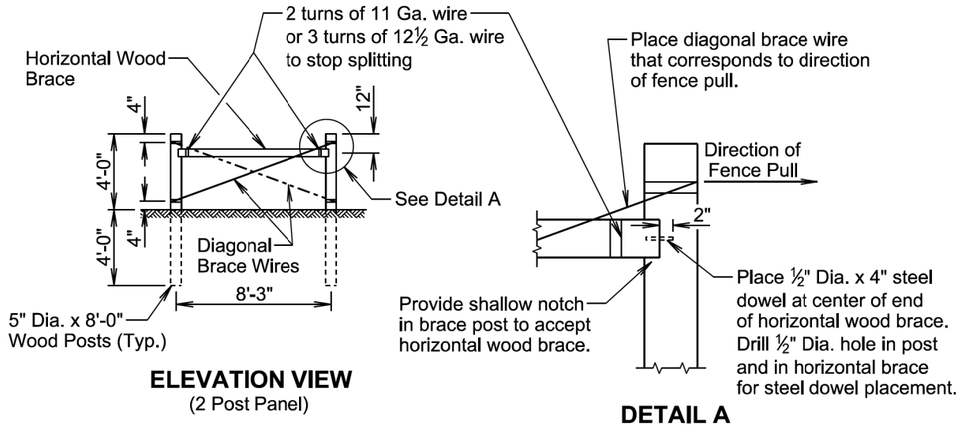
Published Date: 2024

SDDOT

STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES

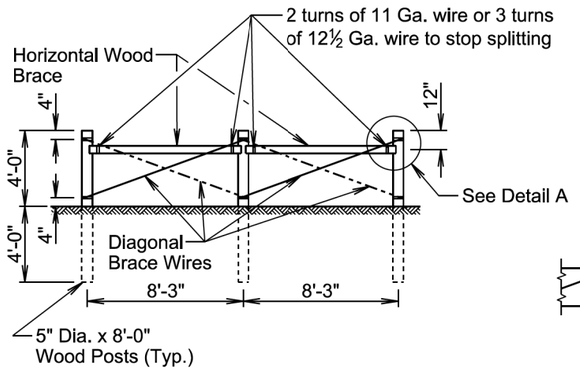
PLATE NUMBER 620.02

Sheet 1 of 1

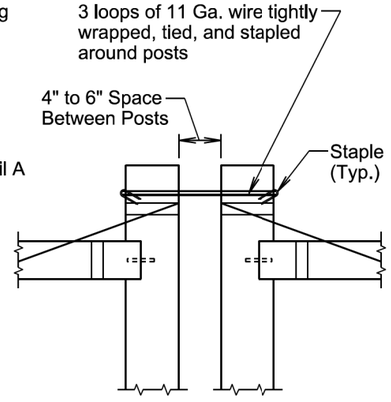


ELEVATION VIEW
(2 Post Panel)

DETAIL A



ELEVATION VIEW
(3 Post Panel)



DETAIL B

GENERAL NOTES:

Two Post Panels will be installed at least every 1320' between corners.

Two Post Panels will be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces will consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires will be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires will be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

January 22, 2023

Published Date: 2024	SDDOT	*BRACE PANELS AND APPLICATIONS OF BRACE PANELS*	*PLATE NUMBER* 620.03
			Sheet 1 of 3

SPACING OF 2 POST PANELS WITHIN CURVES	
RADIUS OF CURVE	SPACING OF 2 POST PANEL
Greater than 1800 Ft.	** 1320'
Less than 1800 Ft.	**At P.C., P.T., and at every 1320' between P.C. and P.T.

** Fence lengths greater than 1320' and less than 2640' place 2 Post Panel approximately at midpoint.

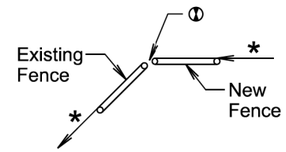
① See Detail B on Sheet 1 of 3.

GENERAL NOTE:

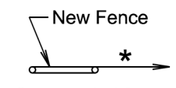
All degrees of curvature stated for fence are at centerline of roadway.

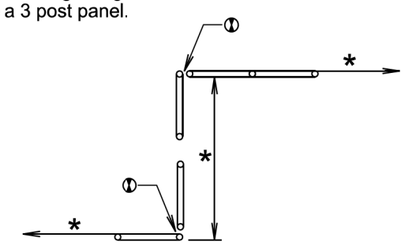
If fence length is less than 600' to next corner use a 2 post panel.

* If fence length is greater than 600' to next corner use a 3 post panel.

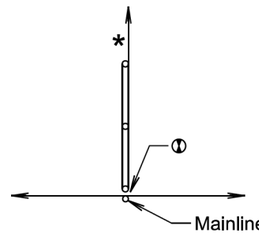


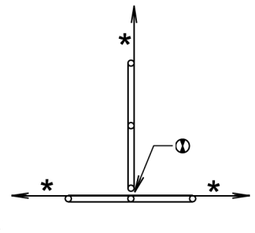
BEGIN OR END FENCE
(Where new fence ties into existing fence)



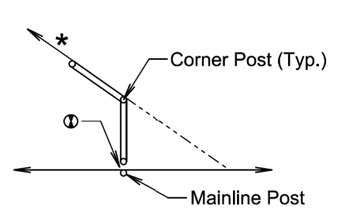


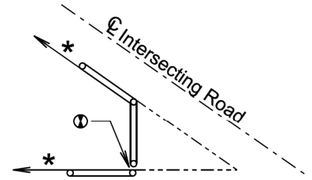
SHORT JOGS IN FENCE

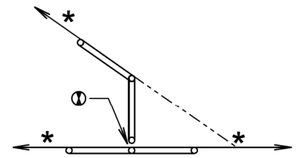




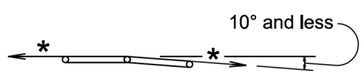
CROSS FENCE



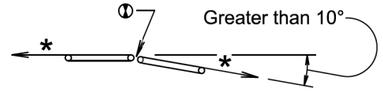




SHARP ANGLES IN CROSS FENCE



Additional fence panel is NOT required when an angle in the mainline fence is 10° and less.

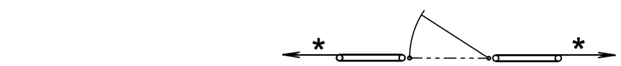


Additional fence panel is required when an angle in the mainline fence is greater than 10°.

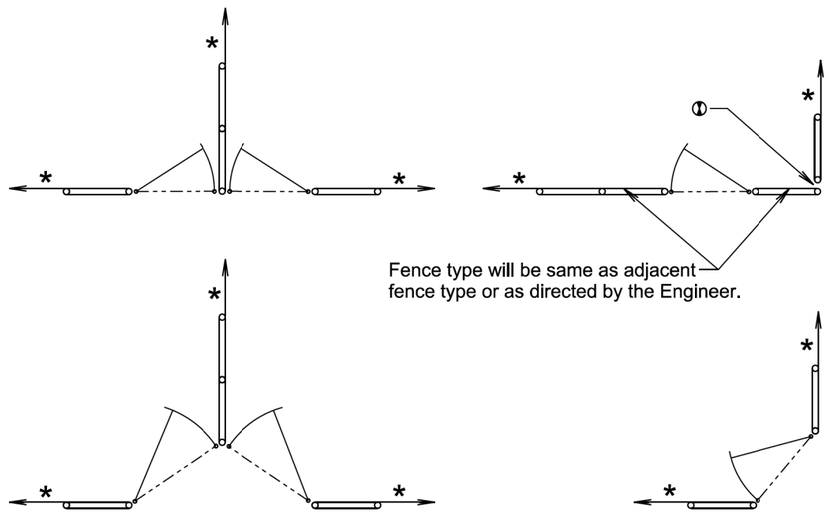
ANGLES IN MAINLINE FENCE

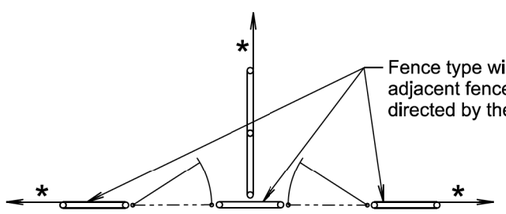
January 22, 2023

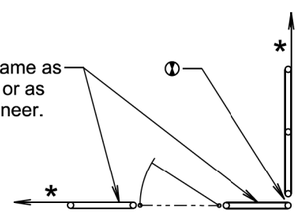
Published Date: 2024	SDDOT	*BRACE PANELS AND APPLICATIONS OF BRACE PANELS*	*PLATE NUMBER* 620.03
			Sheet 2 of 3



ENTRANCE
(Not on corner)







DOUBLE ENTRANCES **ENTRANCES AT CORNERS**

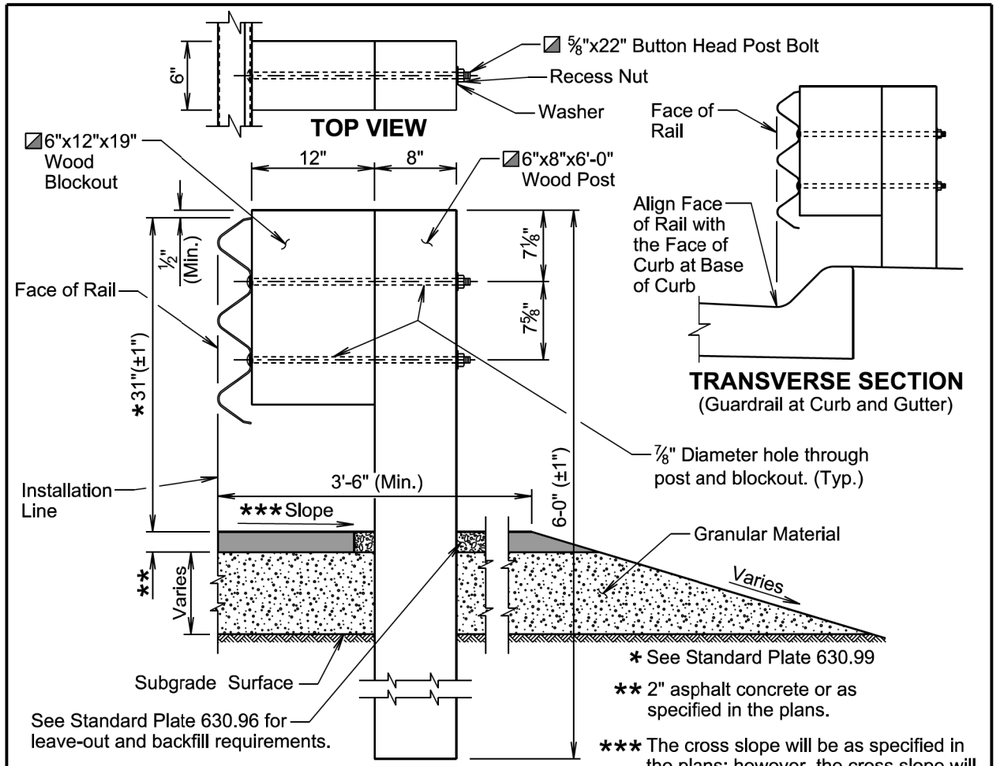
GATES

* If fence length is less than 600' to next corner use a 2 post panel.
If fence length is greater than 600' to next corner use a 3 post panel.

① See Detail B on Sheet 1 of 3.

January 22, 2023

Published Date: 2024	SDDOT	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03
			Sheet 3 of 3



TRANSVERSE SECTION

GENERAL NOTES:

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite."

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing.

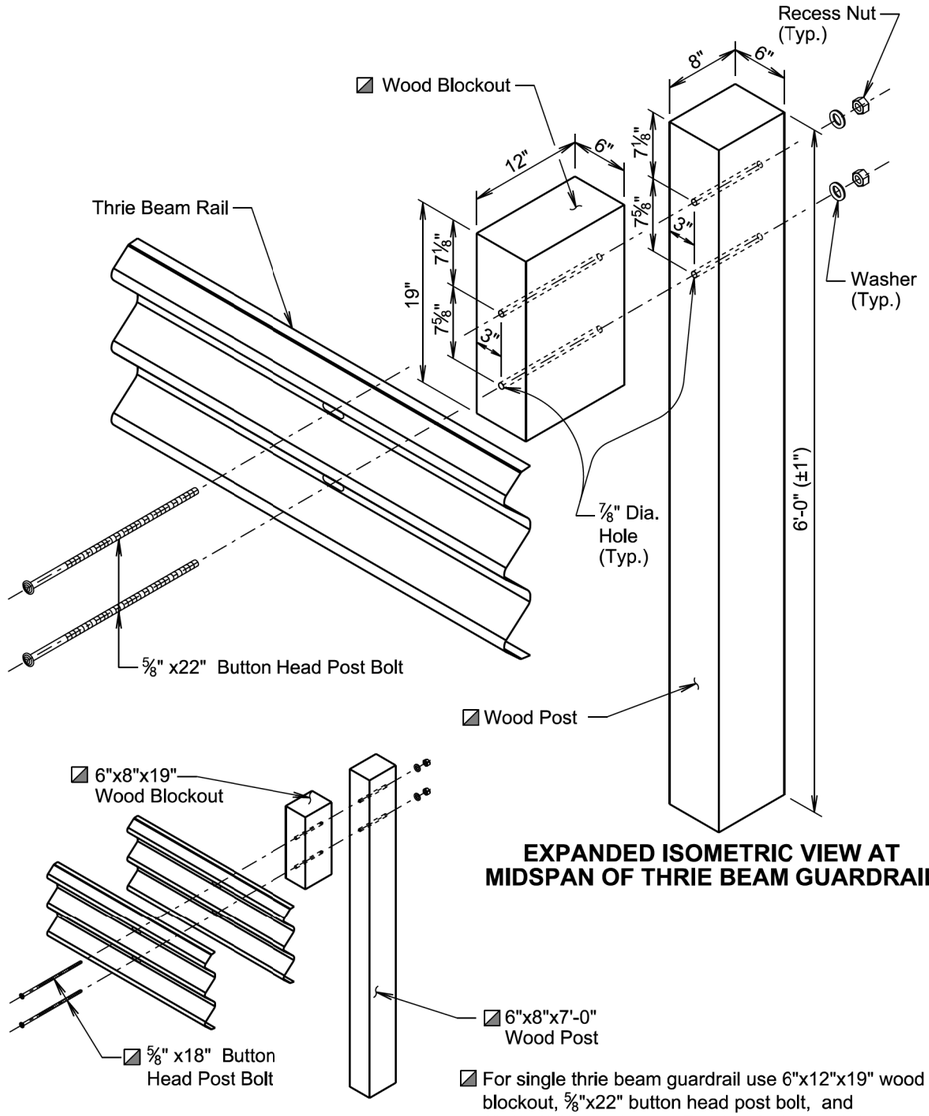
☑ The post and blockout illustrated above is typical for single thrie beam guardrail. When other variations of posts and blockouts are specified on other standard plates (e.g. transitions) then the posts and blockouts will be as specified on the other standard plates or as specified in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

The top of post and top of block will have a true square cut. The top of block will be a maximum of ±½ inch from the top of the post.

September 14, 2019

Published Date: 2024	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
			Sheet 1 of 5



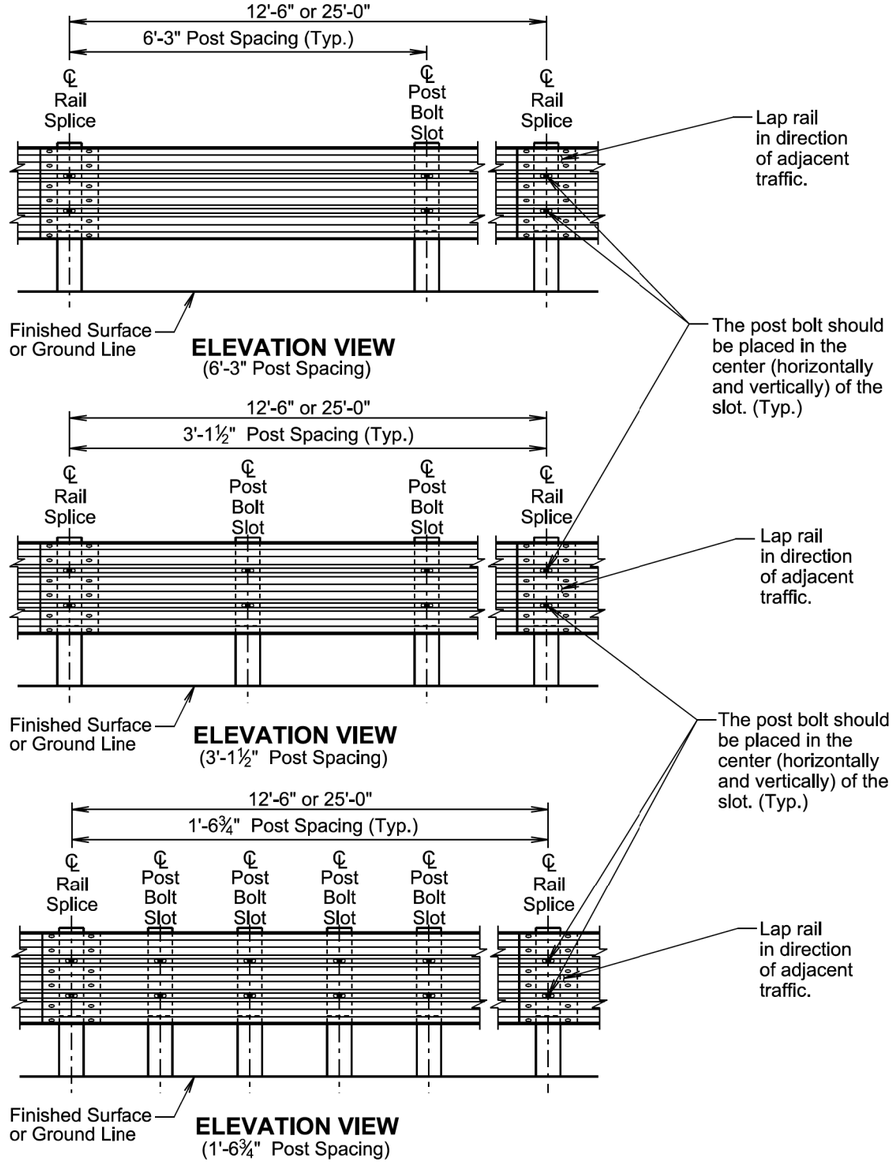
EXPANDED ISOMETRIC VIEW AT MIDSPAN OF THRIE BEAM GUARDRAIL

EXPANDED ISOMETRIC VIEW OF DOUBLE (NESTED) THRIE BEAM GUARDRAIL AT MIDSPAN
(For Information Only, Not to Scale)

- For single thrie beam guardrail use 6"x12"x19" wood blockout, ⅝"x22" button head post bolt, and 6"x8"x6'-0" wood post. For double (nested) thrie beam guardrail use 6"x8"x19" wood blockout, ⅝"x18" button head post bolt, and 6"x8"x7'-0" wood post.

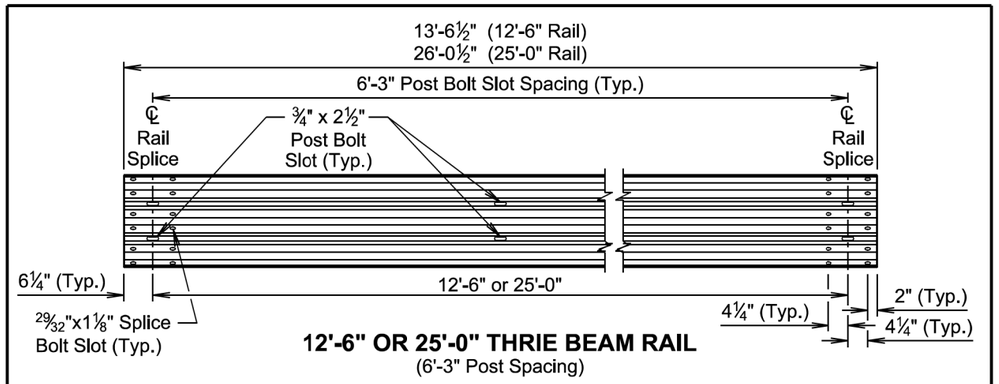
September 14, 2019

Published Date: 2024	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01 Sheet 2 of 5

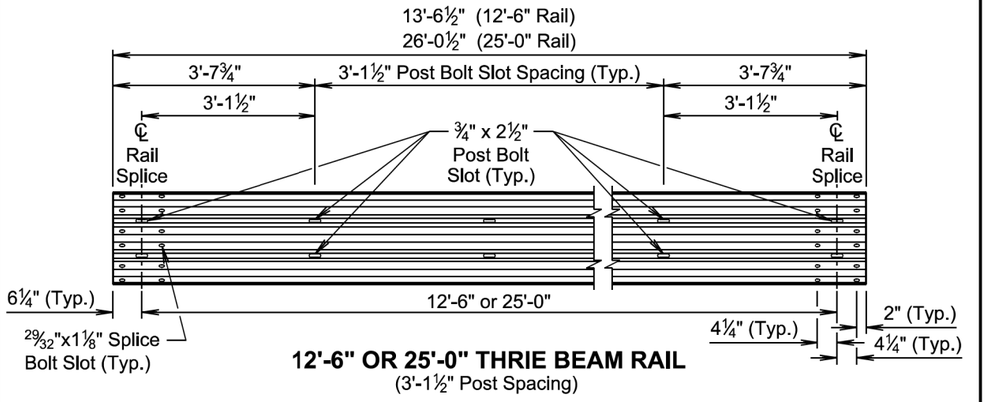


September 14, 2019

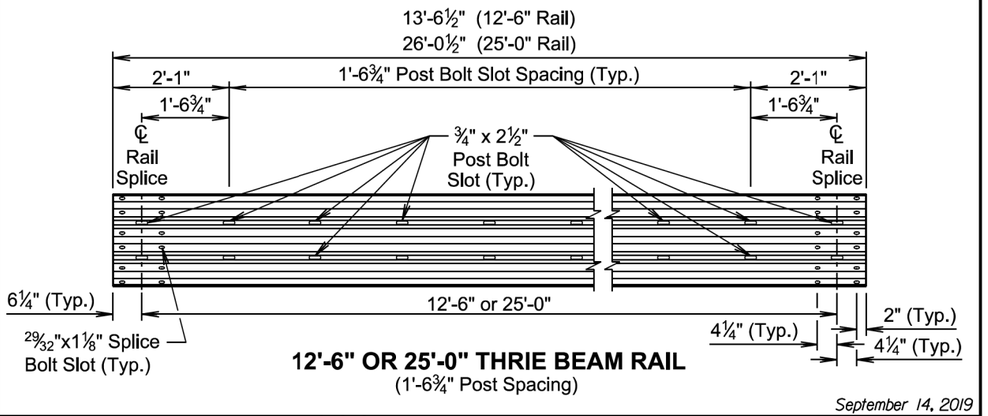
Published Date: 2024	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01 Sheet 3 of 5



12'-6" OR 25'-0" THRIE BEAM RAIL
(6'-3" Post Spacing)



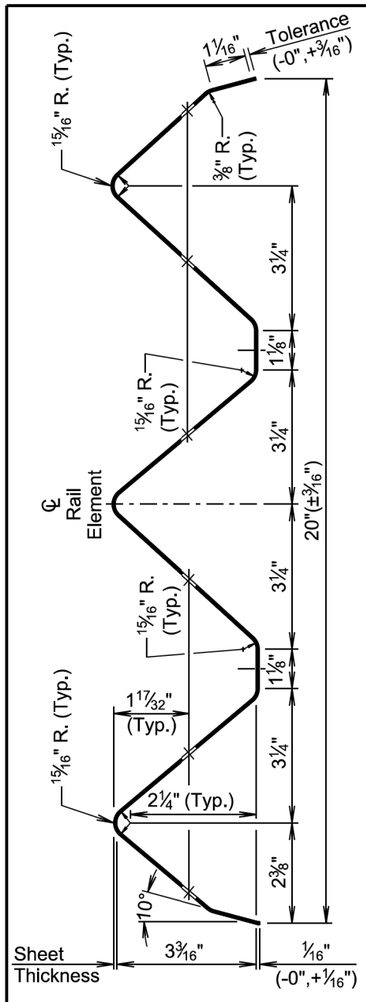
12'-6" OR 25'-0" THRIE BEAM RAIL
(3'-1½" Post Spacing)



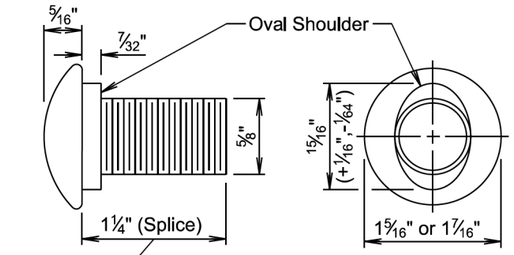
12'-6" OR 25'-0" THRIE BEAM RAIL
(1'-6¾" Post Spacing)

September 14, 2019

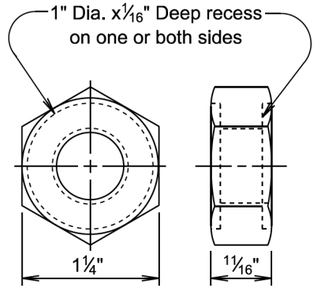
Published Date: 2024	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
			Sheet 4 of 5



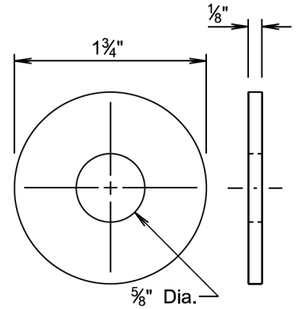
SECTION THROUGH THRIE BEAM RAIL



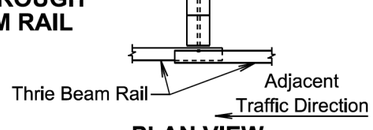
SPLICE BOLT AND POST BOLT
(⅝" Button Head Bolt)



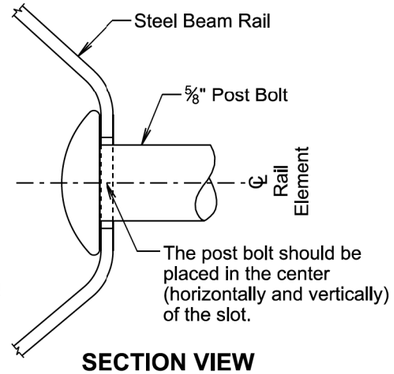
RECESS NUT
(At lap splices, the recess will be placed against the steel rail.)



WASHER
(The washer will be placed between the back side of wood post and the recess nut, see sheet 1 and 2.)



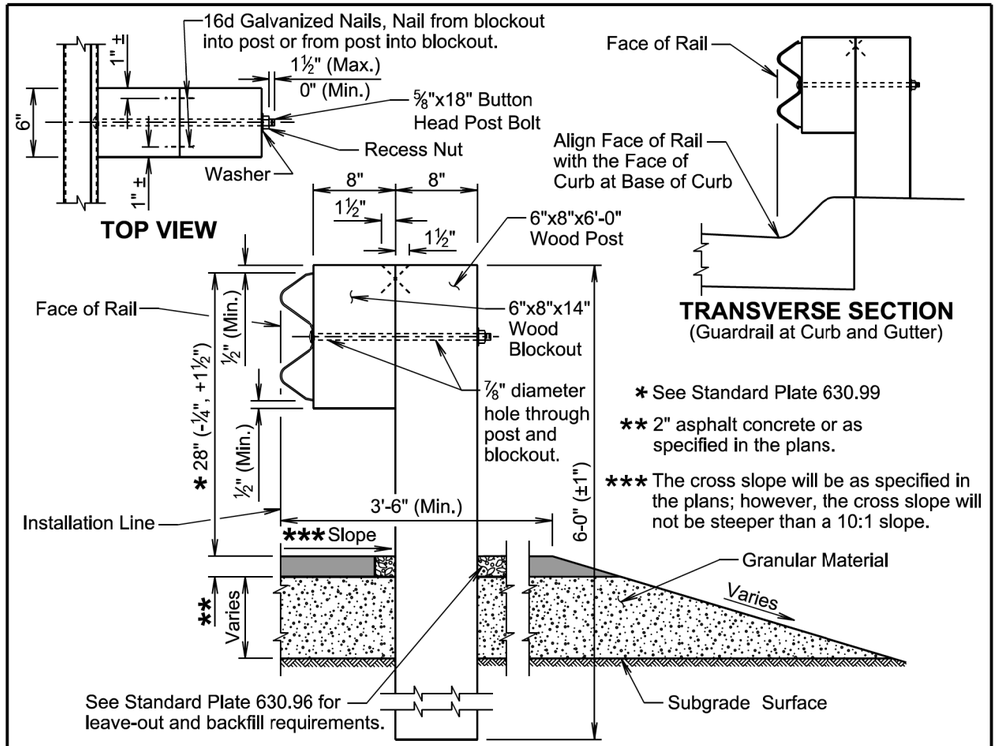
PLAN VIEW
(Lap Splice)
(Lap rail in direction of adjacent traffic.)
(12 splice bolts and 12 recess nuts per splice, NO washers)



SECTION VIEW
(At Post Bolt)

September 14, 2019

Published Date: 2024	SDDOT	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
			Sheet 5 of 5



* See Standard Plate 630.99

** 2" asphalt concrete or as specified in the plans.

*** The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

GENERAL NOTES:

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite".

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing.

All W beam rail will be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

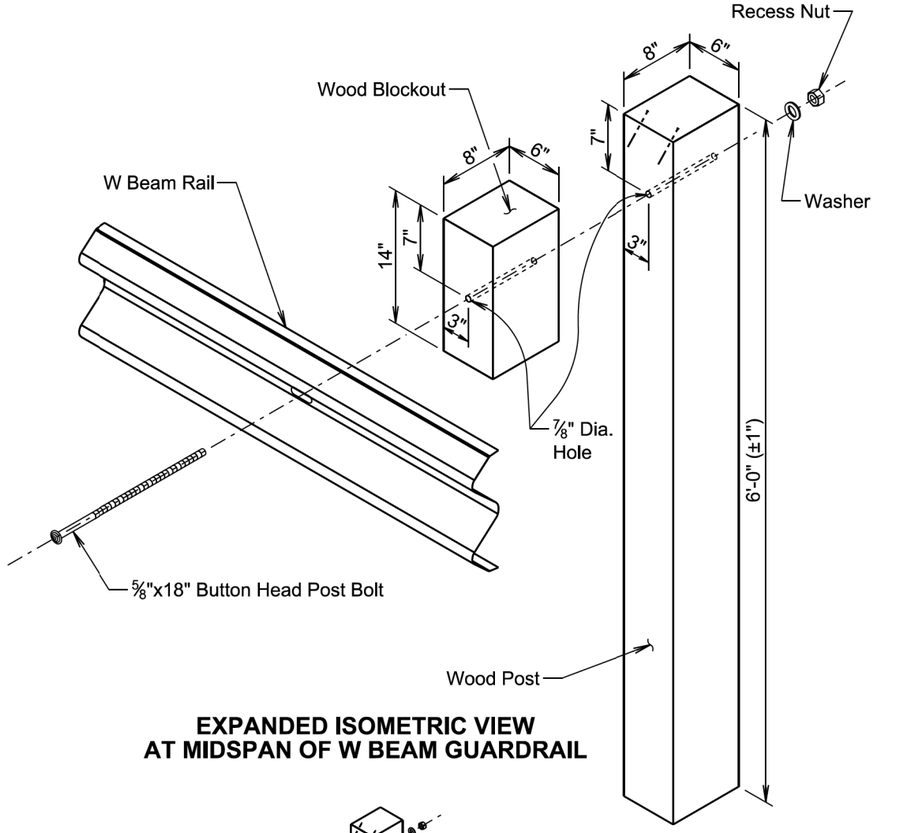
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

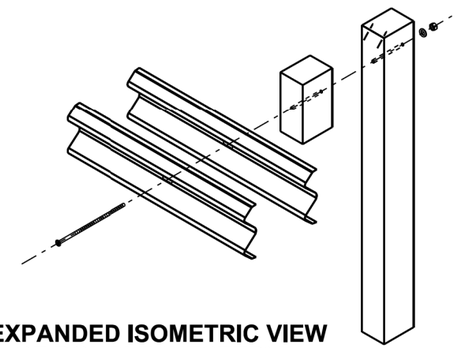
Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

The top of post and top of block will have a true square cut. The top of block will be a maximum of ± ½ inch from the top of the post.

September 14, 2019

Published Date: 2024	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 1 of 5

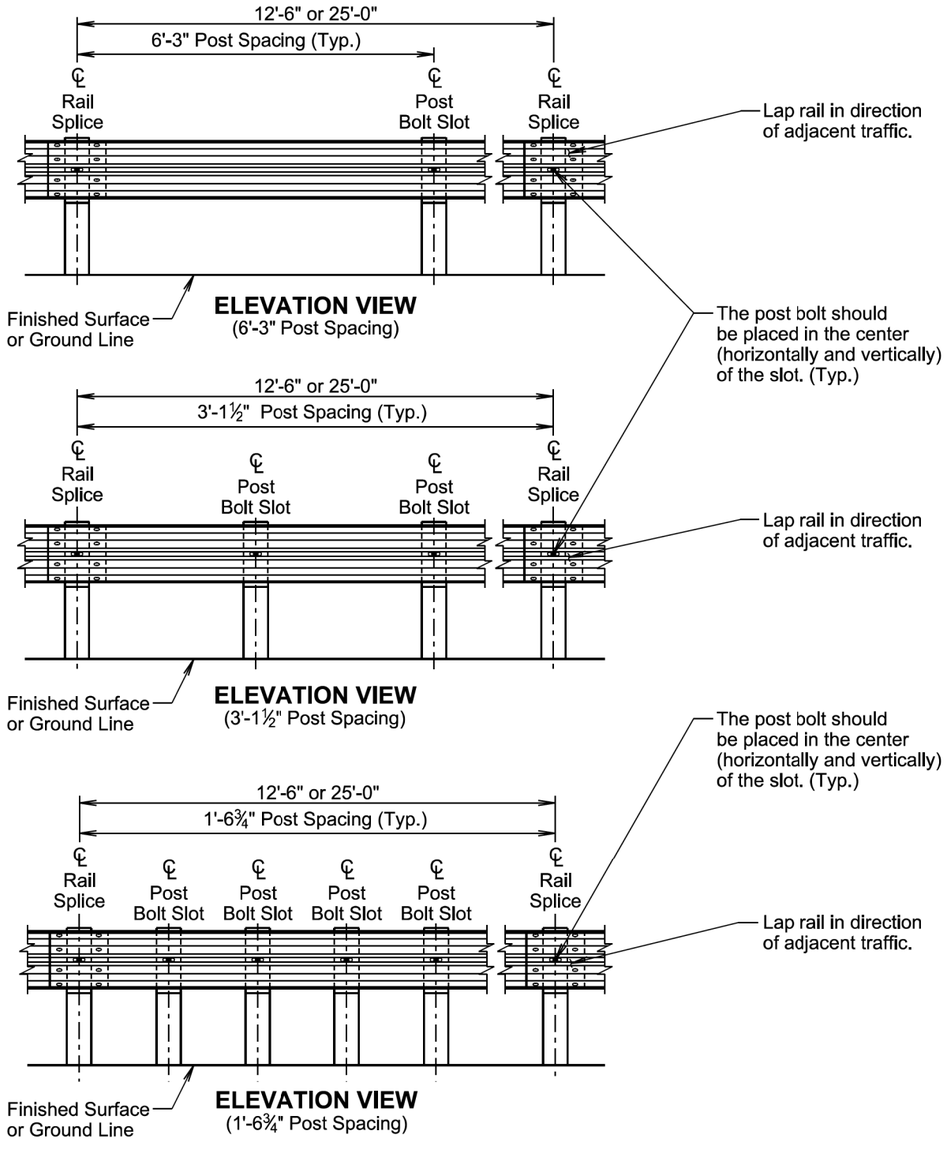




EXPANDED ISOMETRIC VIEW OF DOUBLE (NESTED) W BEAM GUARDRAIL AT MIDSPAN
(For Information Only, Not to Scale)

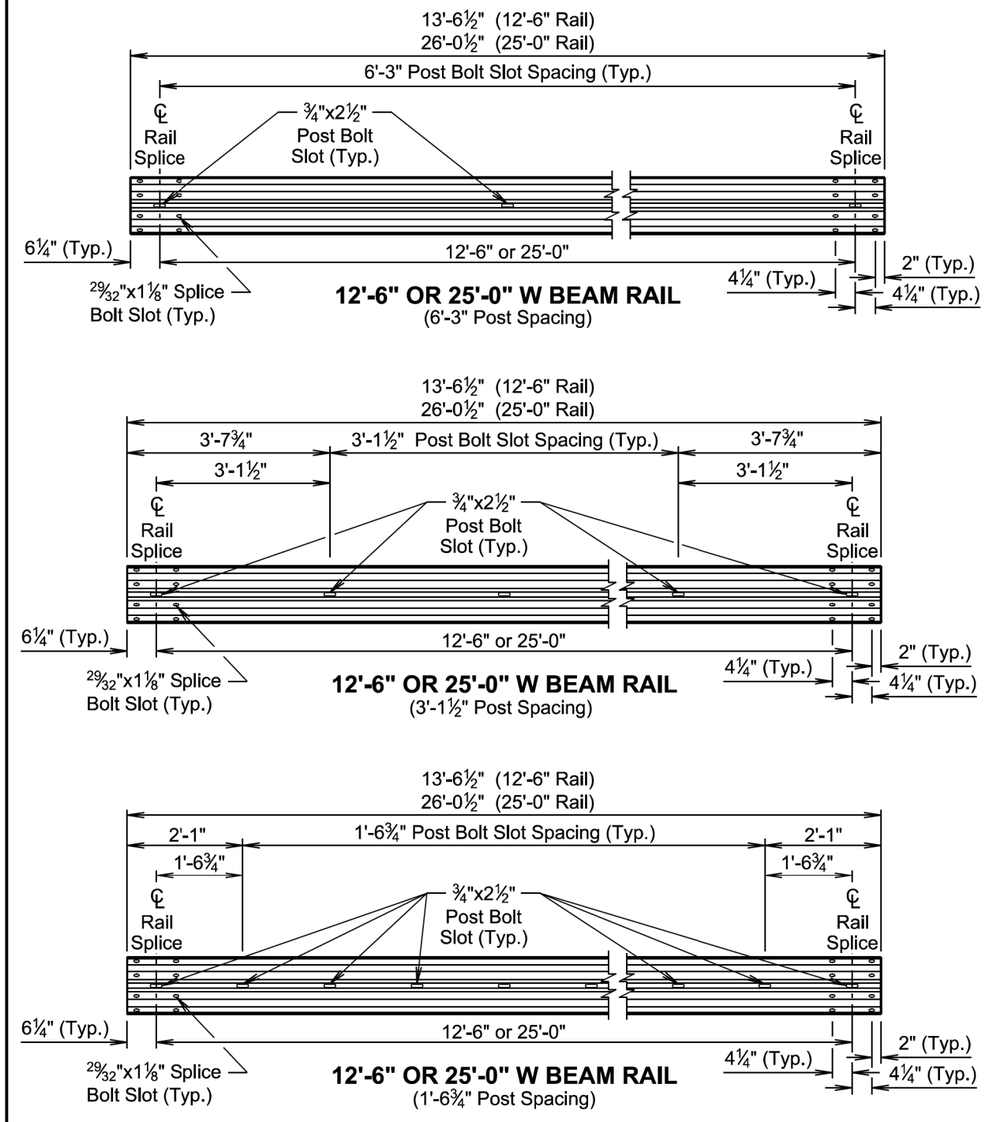
September 14, 2019

Published Date: 2024	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 2 of 5



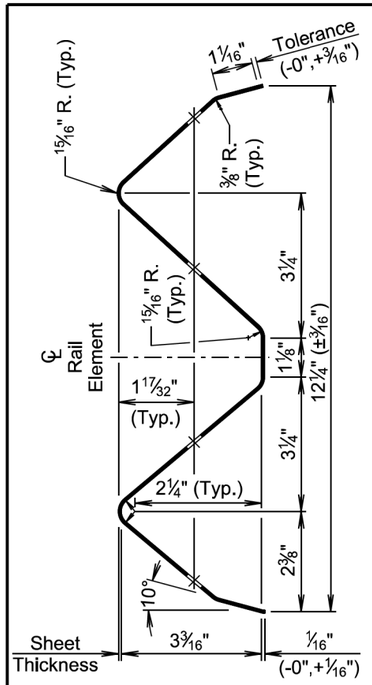
September 14, 2019

Published Date: 2024	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 3 of 5

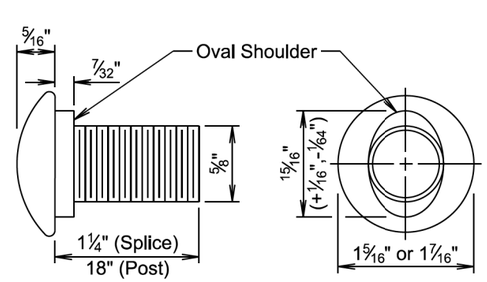


September 14, 2019

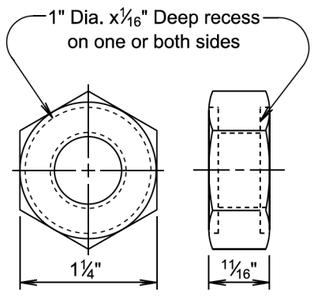
Published Date: 2024	SDDOT	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 4 of 5



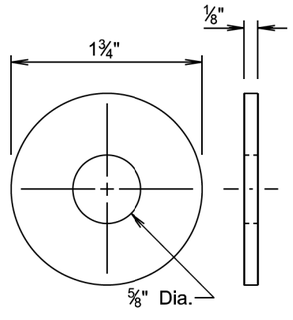
SECTION THROUGH W BEAM RAIL



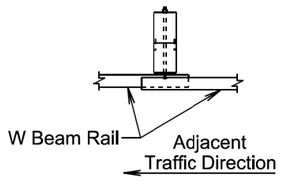
SPLICE BOLT AND POST BOLT
(5/8" Button Head Bolt)



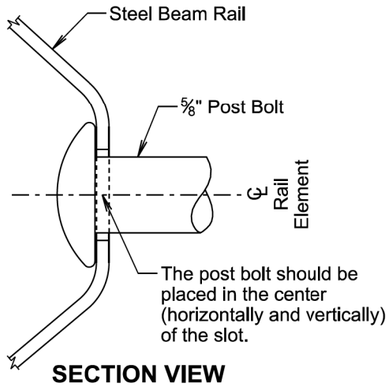
RECESS NUT
(At lap splices, the recess will be placed against the steel rail.)



WASHER
(The washer will be placed between the back side of wood post and the recess nut, see sheet 1 and 2.)



PLAN VIEW
(Lap Splice)
(Lap rail in direction of adjacent traffic.)
(8 splice bolts and 8 recess nuts per splice, NO washers)



SECTION VIEW
(At Post Bolt)

September 14, 2019

Published Date: 2024	SDDOT	*W BEAM GUARDRAIL*	*PLATE NUMBER* 630.10 *Sheet 5 of 5*

TYPE AND DETAILS OF MGS

Type of MGS	W Beam Rail Single or Double (Nested)	Blockout Size	Blockout Material	Post Size	Post Material	Post Spacing
1	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"
1C	Single	6"x12"x14"	Wood	6"x8"x7'-6"	Wood	6'-3"
2	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	3'-1½"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6¾"
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"

STANDARD PLATE REFERENCE

Type of MGS	See Standard Plate(s)
1	630.20, 630.22
1C	630.20, 630.25
2	630.20
3	630.20
4	630.20

GENERAL NOTES:

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite".

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing on sheet 2 of 6.

All W beam rail will be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

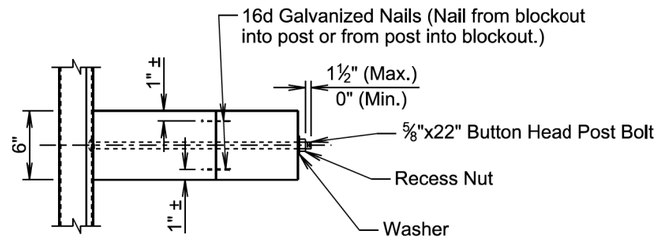
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

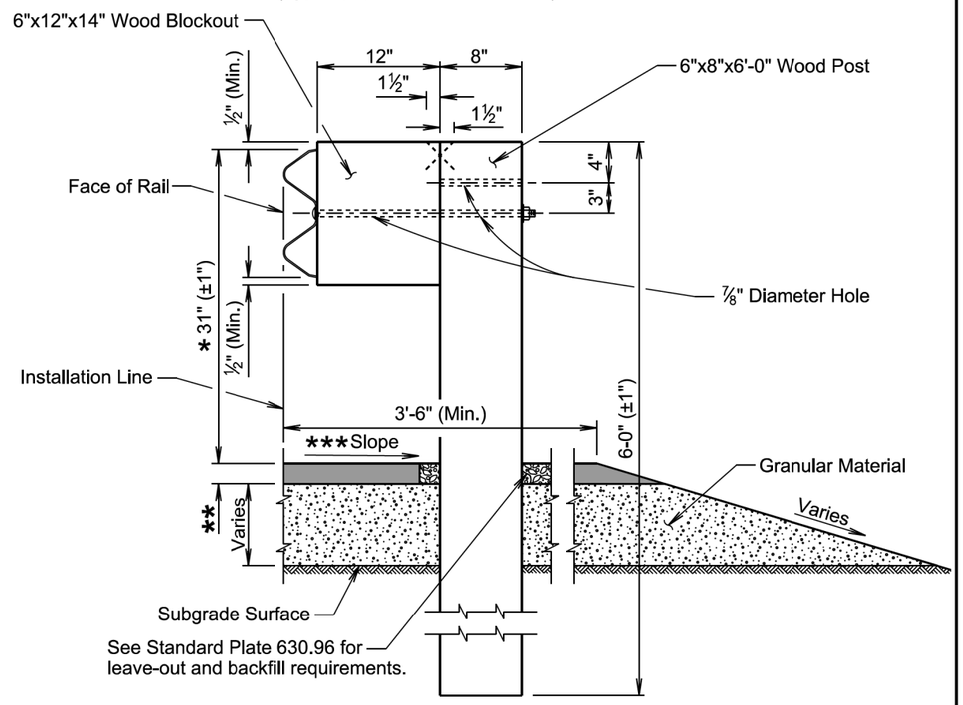
All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware will be incidental to the contract unit price per foot for the respective MGS contract item.

September 14, 2019

Published Date: 2024	SDDOT	*MIDWEST GUARDRAIL SYSTEM (MGS)*	*PLATE NUMBER* 630.20 *Sheet 1 of 6*



TOP VIEW
(Type 1, 2, or 3 MGS Installation)



TRANSVERSE SECTION
(Type 1, 2, or 3 MGS Installation)

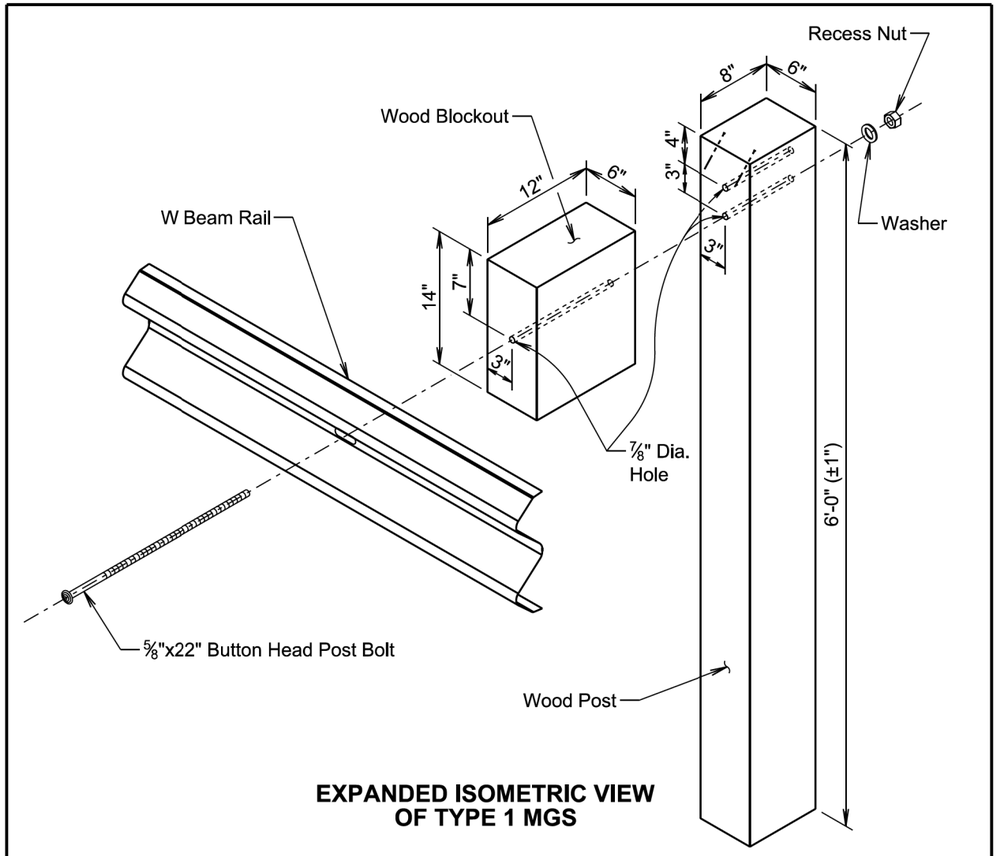
* See Standard Plate 630.99

** 2" asphalt concrete or as specified in the plans.

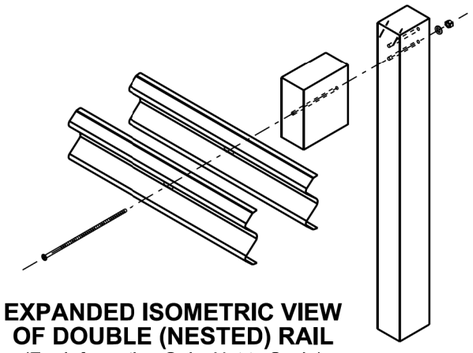
*** The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

September 14, 2019

Published Date: 2024	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 2 of 6



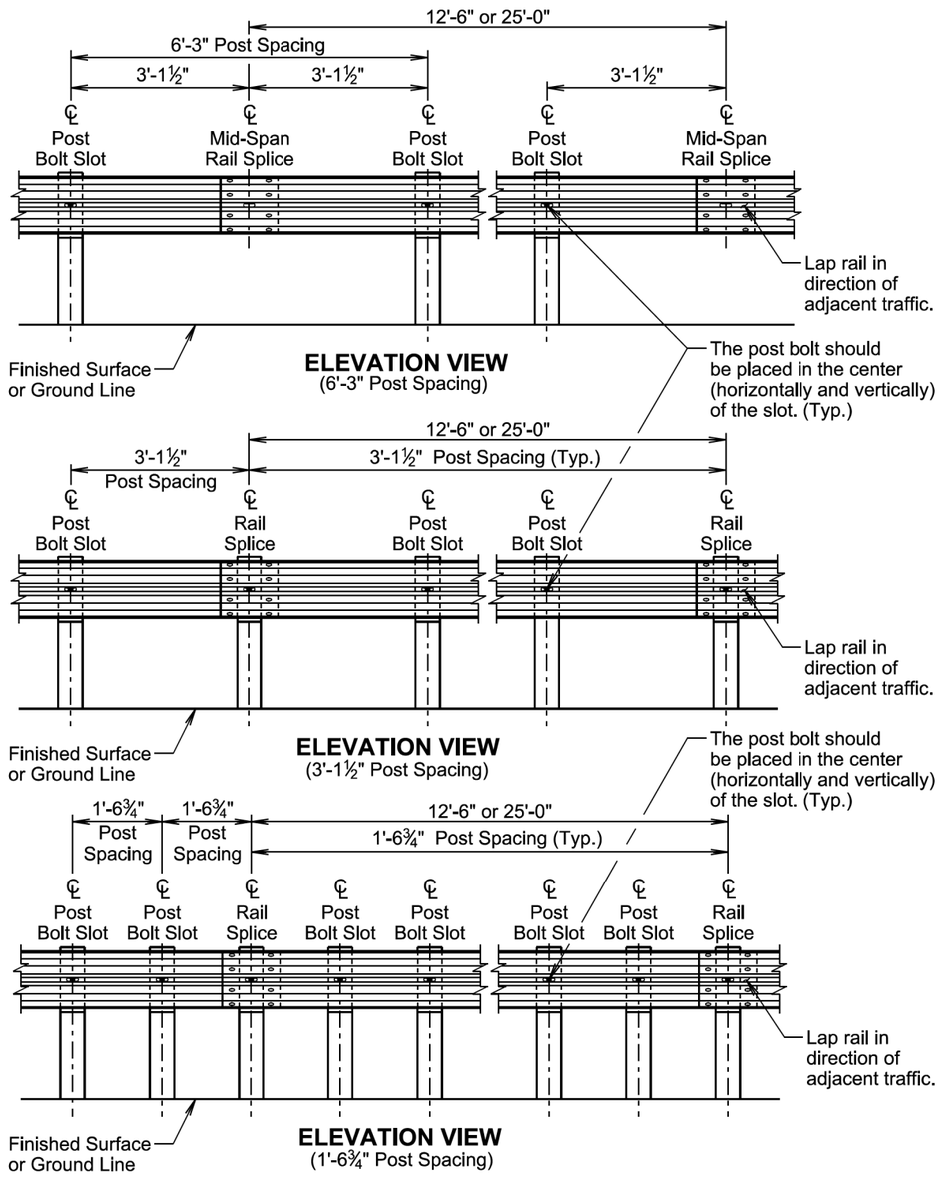
EXPANDED ISOMETRIC VIEW OF TYPE 1 MGS



EXPANDED ISOMETRIC VIEW OF DOUBLE (NESTED) RAIL
(For Information Only, Not to Scale)

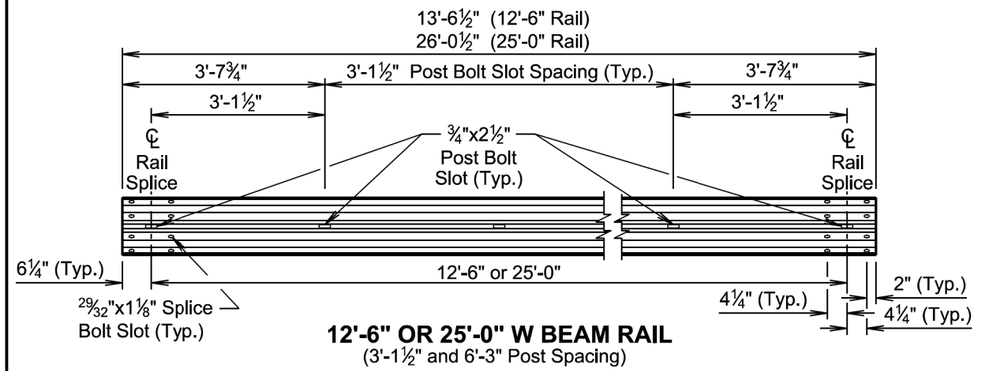
September 14, 2019

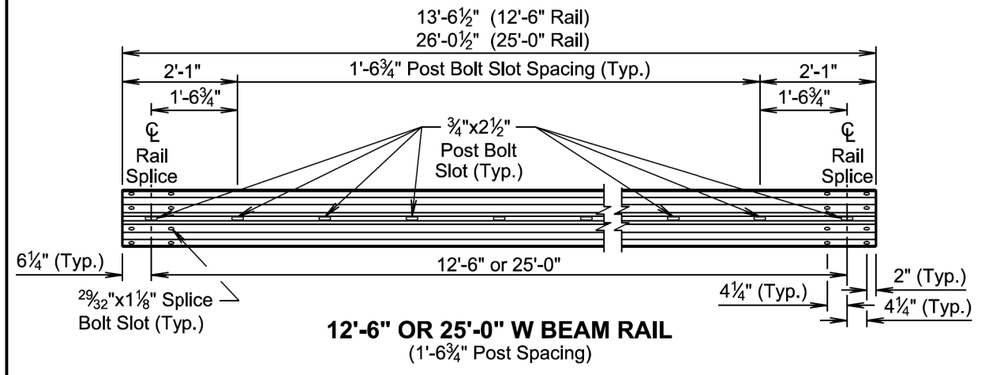
Published Date: 2024	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 3 of 6



September 14, 2019

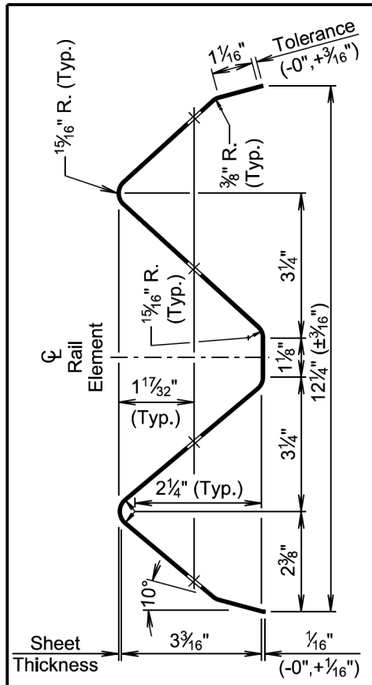
Published Date: 2024	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 4 of 6



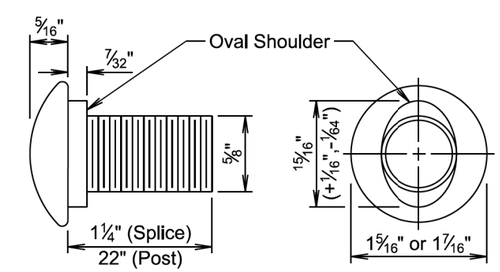


September 14, 2019

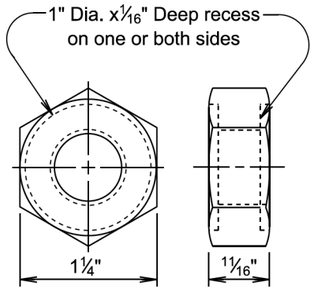
Published Date: 2024	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 5 of 6



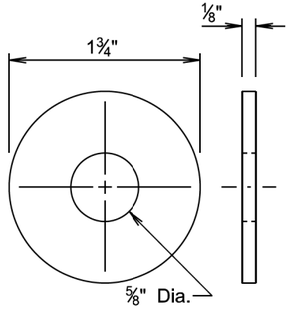
SECTION THROUGH W BEAM RAIL



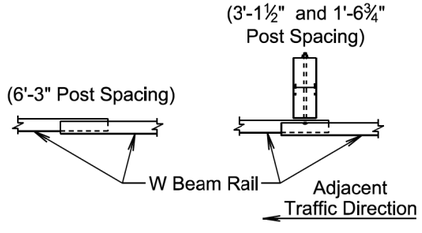
SPLICE BOLT AND POST BOLT
(5/8" Button Head Bolt)



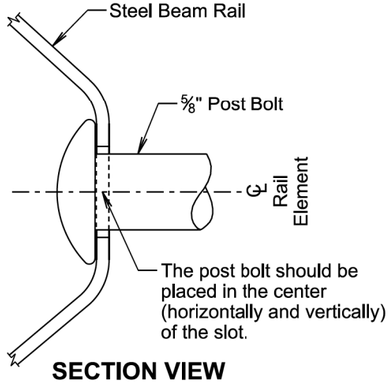
RECESS NUT
(At lap splices, the recess will be placed against the steel rail.)



WASHER
(The washer will be placed between the back side of wood post and the recess nut, see sheet 2 and 3.)



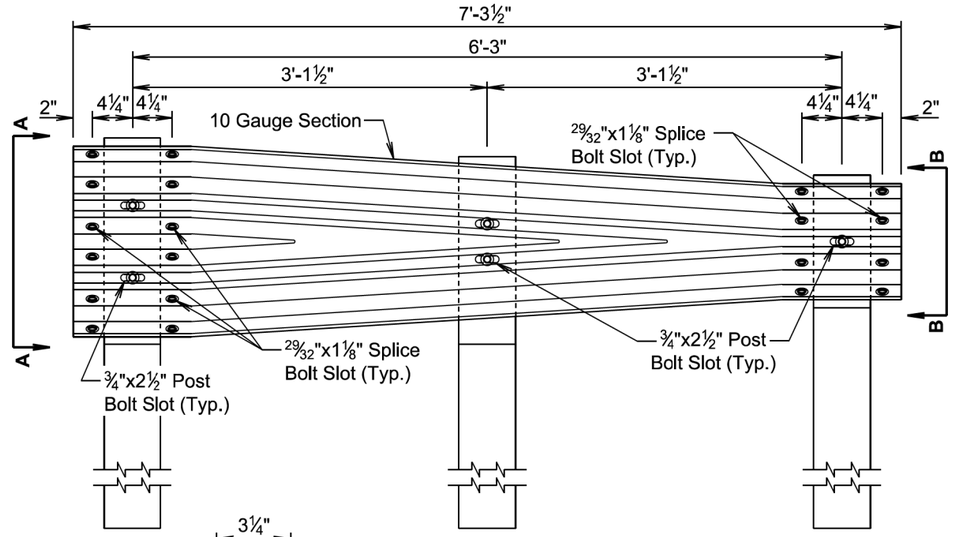
PLAN VIEW
(Lap Splice)
(Lap rail in direction of adjacent traffic.)
(8 splice bolts and 8 recess nuts per splice, NO washers)



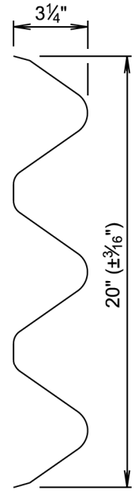
SECTION VIEW
(At Post Bolt)

September 14, 2019

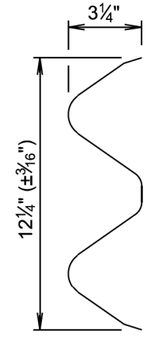
Published Date: 2024	SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 6 of 6



ELEVATION VIEW



VIEW A-A



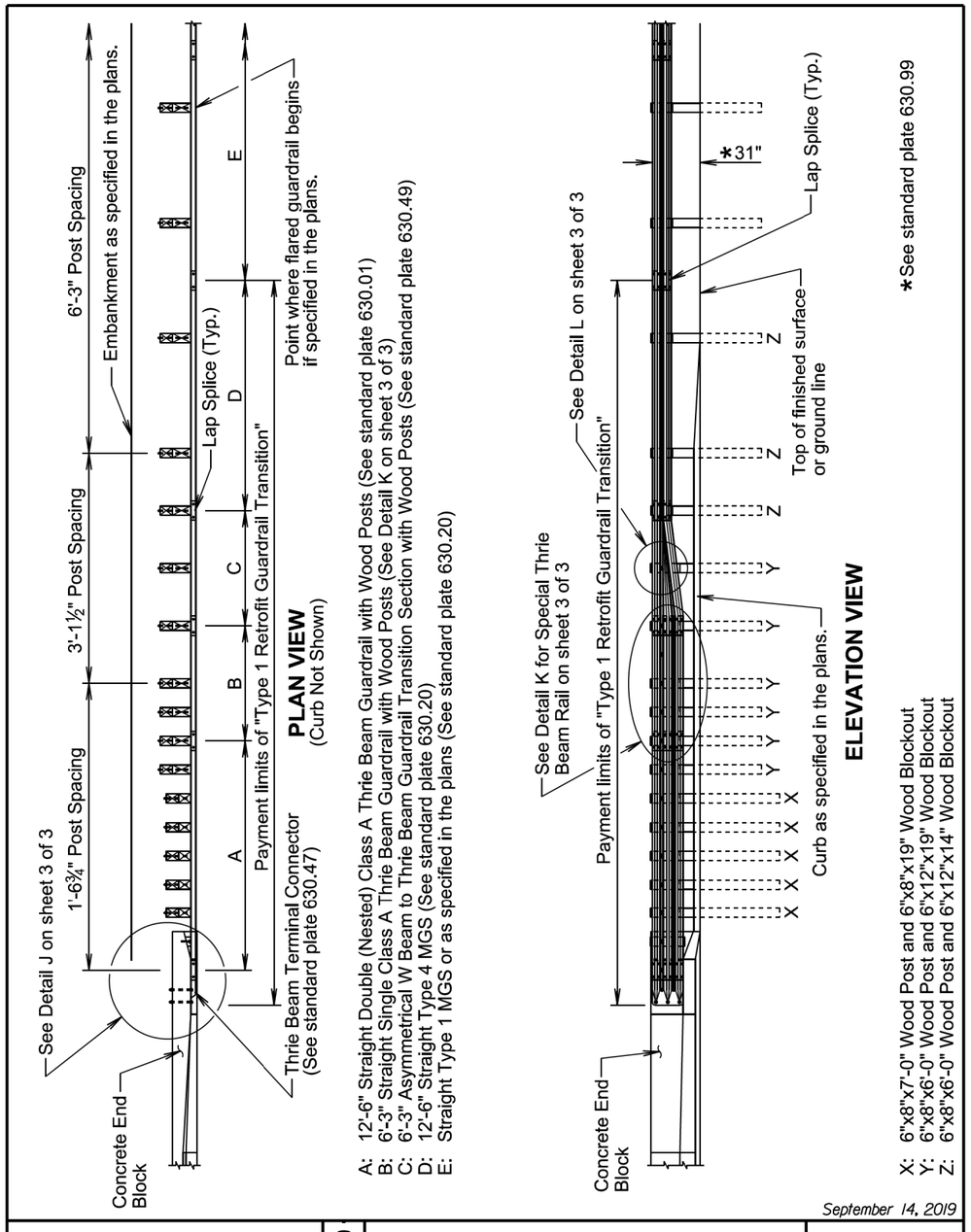
VIEW B-B

GENERAL NOTES:

All costs for furnishing and installing the W beam to thrie beam guardrail transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware will be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

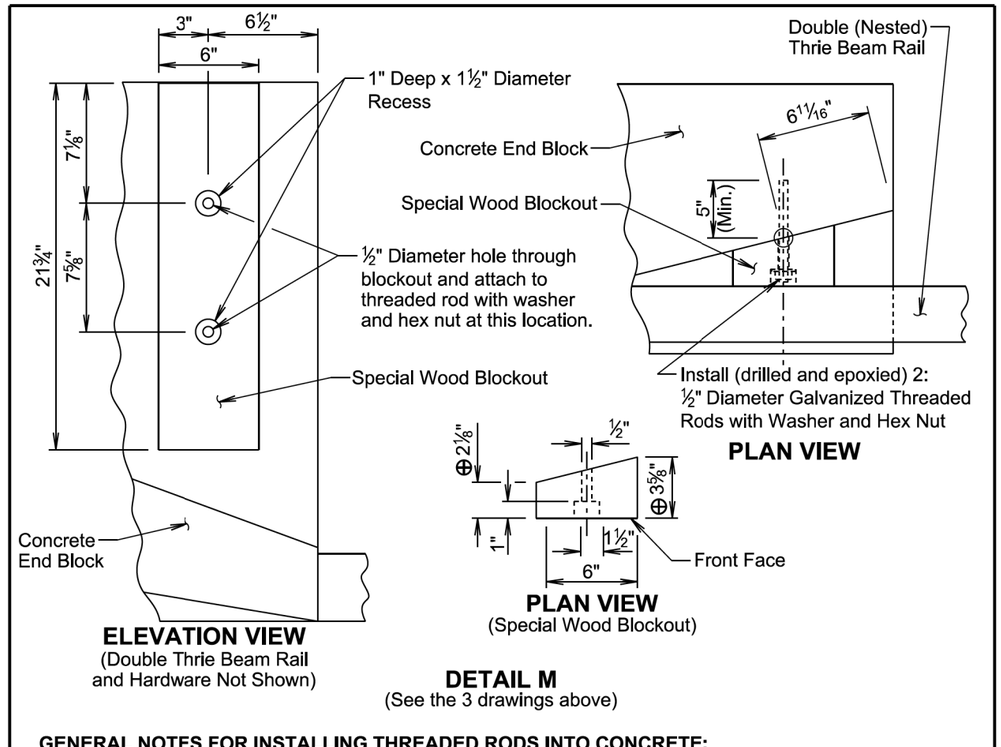
September 14, 2019

Published Date: 2024	SDDOT	W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION	PLATE NUMBER 630.48
			Sheet 1 of 1



September 14, 2019

Published Date: 2024	SDDOT	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51
			Sheet 1 of 3



GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:

⊕ The dimensions shown are estimated based on original construction plans of the concrete end block. The special wood blockout will be cut as necessary such that the front face of the special wood blockout will align with the vertical front face of the concrete end block ±½".

The threaded rods will be ½" diameter and conform to ASTM F1554, Grade 55. The threaded rods will be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes will not be less than ⅛" greater or more than ⅜" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes will not be drilled using core bits. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

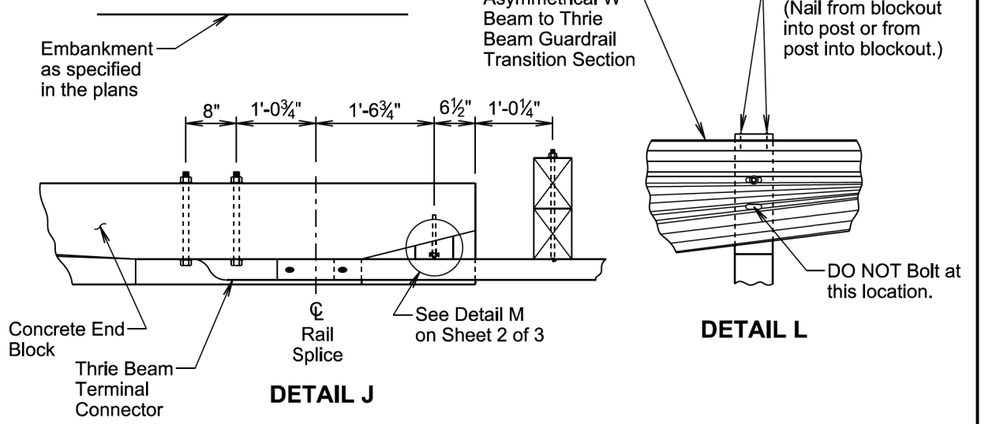
The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes ⅓ to ½ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads will not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

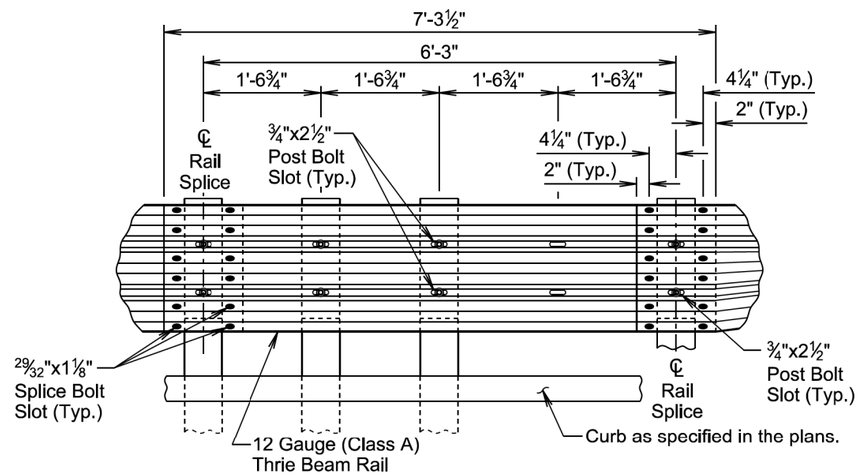
September 14, 2019

Published Date: 2024	SDDOT	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51
			Sheet 2 of 3



DETAIL J

DETAIL L



DETAIL K
(Special Thrie Beam Rail)

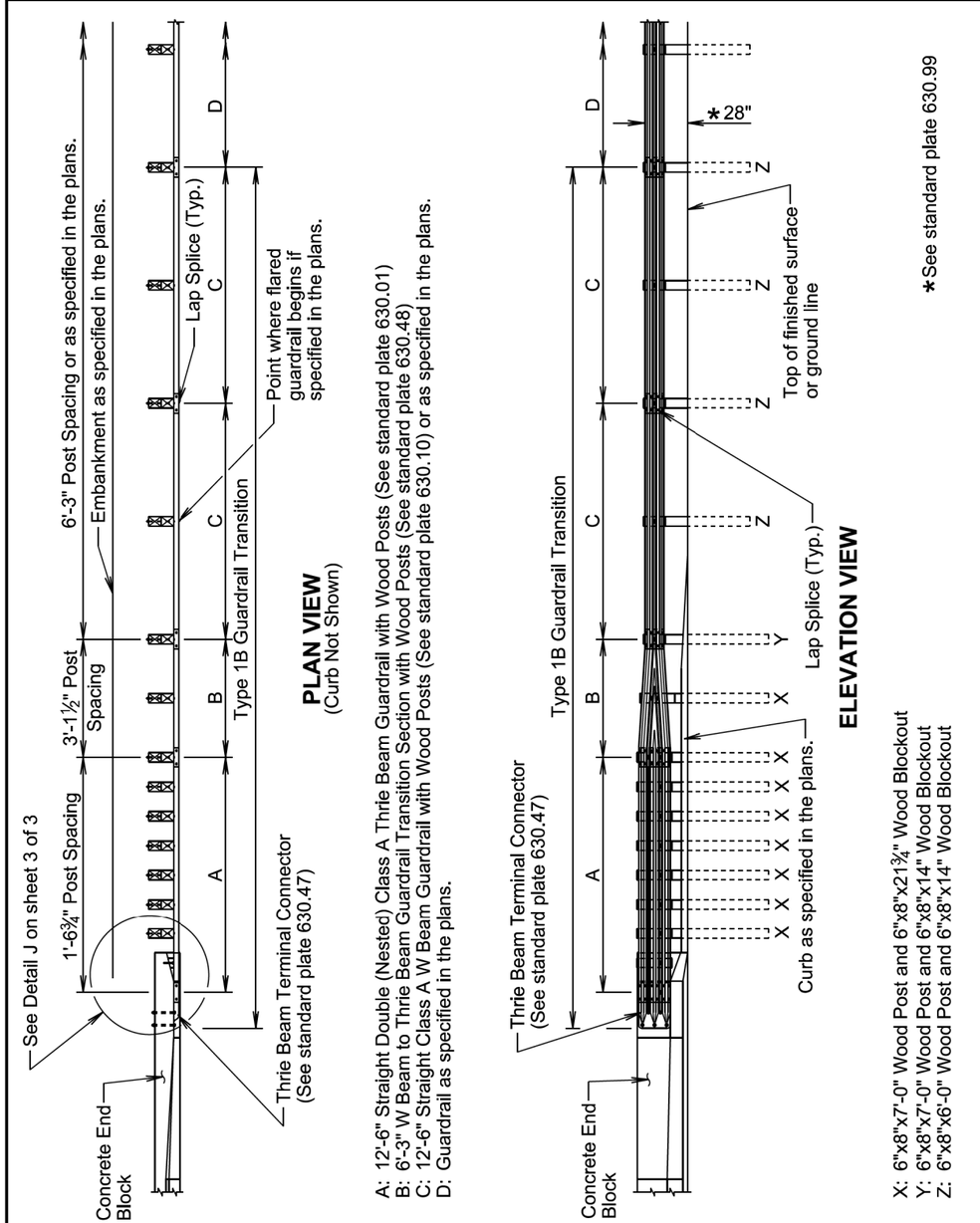
GENERAL NOTES:

Throughout the type 1 retrofit guardrail transition, slots in the rails will be provided as specified in the plans and by the Manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

All costs for furnishing and installing the type 1 retrofit guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, special blockout, hardware, and incidentals will be included in the contract unit price per each for "Type 1 Retrofit Guardrail Transition".

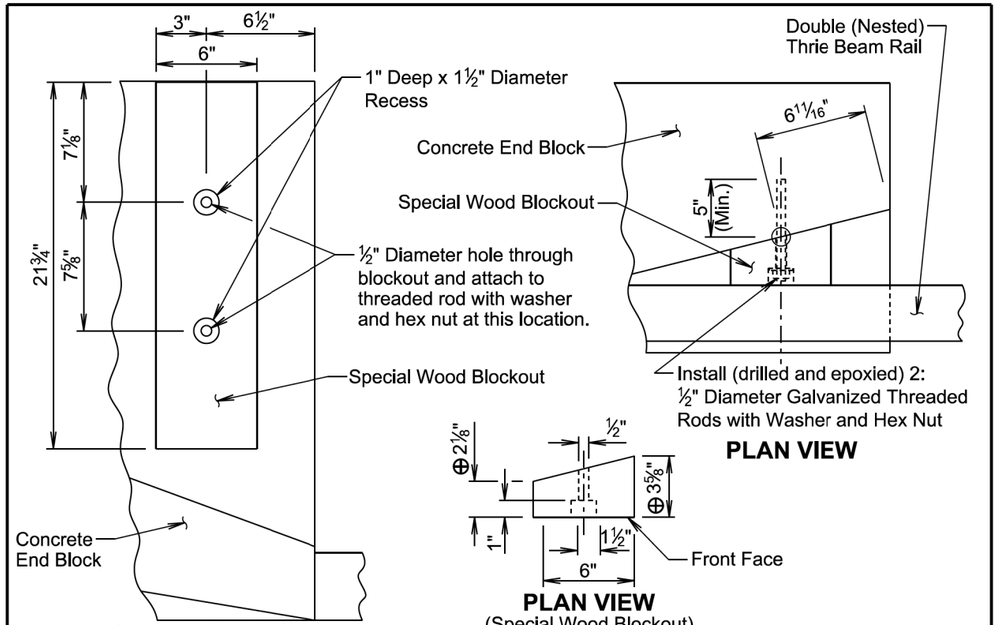
September 14, 2019

Published Date: 2024	SDDOT	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51 Sheet 3 of 3



September 14, 2019

Published Date: 2024	SDDOT	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53 Sheet 1 of 3



DETAIL M
(See the 3 drawings above)

GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:

⊕ The dimensions shown are estimated based on original construction plans of the concrete end block. The special wood blockout will be cut as necessary such that the front face of the special wood blockout will align with the vertical front face of the concrete end block ±½".

The threaded rods will be ½" diameter and conform to ASTM F1554, Grade 55. The threaded rods will be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes will not be less than ⅛" greater or more than ⅜" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes will not be drilled using core bits. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

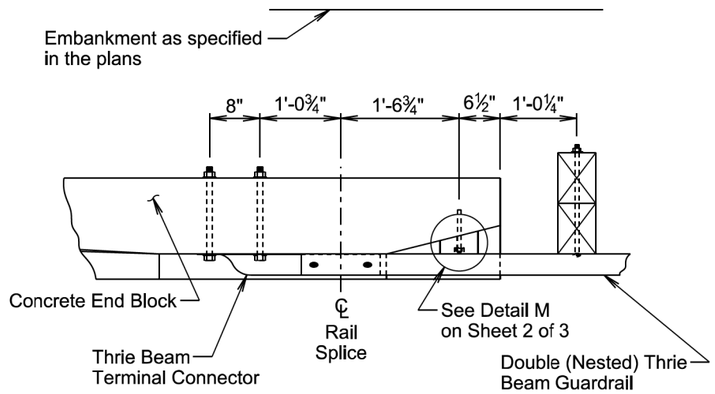
The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes ⅓ to ½ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads will not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

September 14, 2019

Published Date: 2024	SDDOT	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53
			Sheet 2 of 3



DETAIL J

GENERAL NOTES:

Throughout the type 1B guardrail transition, slots in the rails will be provided as specified in the plans and by the Manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

All costs for furnishing and installing the straight double class A thrie beam guardrail including labor, equipment, and materials including the thrie beam rails, posts, blockouts, special blockout, thrie beam terminal connector, and hardware will be incidental to the contract unit price per foot for "Straight Double Class A Thrie Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 1B guardrail transition including labor, equipment, and materials will be included in the contract unit price for the respective guardrail contract items.

September 14, 2019

Published Date: 2024	SDDOT	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53
			Sheet 3 of 3

Published Date: 2024

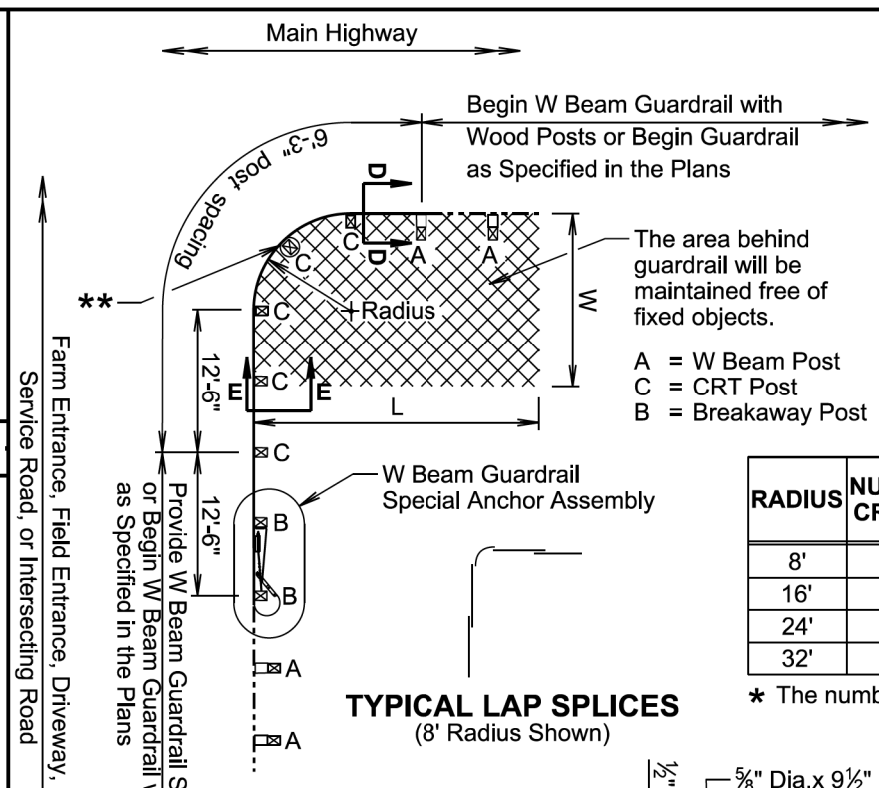
SDDOT

SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY

PLATE NUMBER 630.84

Sheet 1 of 4

September 14, 2019



TYPICAL LAP SPLICES
(8' Radius Shown)

GENERAL NOTES:

Washers will NOT be used on the face of the rail under the ⅝" button head bolts connecting the rail to the Controlled Releasing Terminal (CRT) posts.

** The rail will NOT be bolted to the CRT post at the center of the 8' radius nose only.

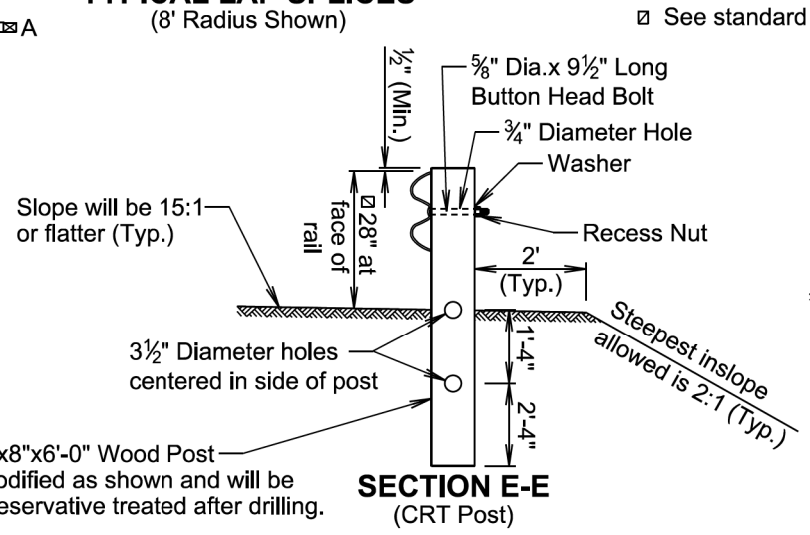
The curved guardrail sections will be shop bent.

The W Beam Guardrail Special Anchor has NOT been tested as a crashworthy end treatment for approaching traffic on the intersecting roadway. Therefore, its use will be limited to farm and field entrances, driveways, or service roads.

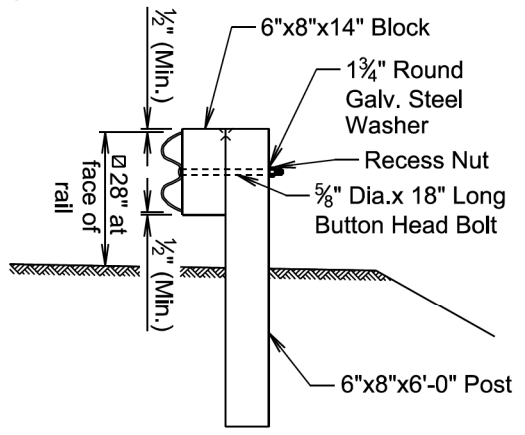
RADIUS	NUMBER OF CRT POSTS	*NUMBER AND LENGTH OF CURVED RAILS	REQUIRED AREA FREE OF FIXED OBJECTS (L x W)
8'	5	1 @ 12.5'	25' x 15'
16'	7	1 @ 25'	30' x 15'
24'	9	1 @ 25' and 1 @ 12.5'	40' x 20'
32'	11	2 @ 25'	50' x 20'

* The number of rails is based on a 90° intersection.

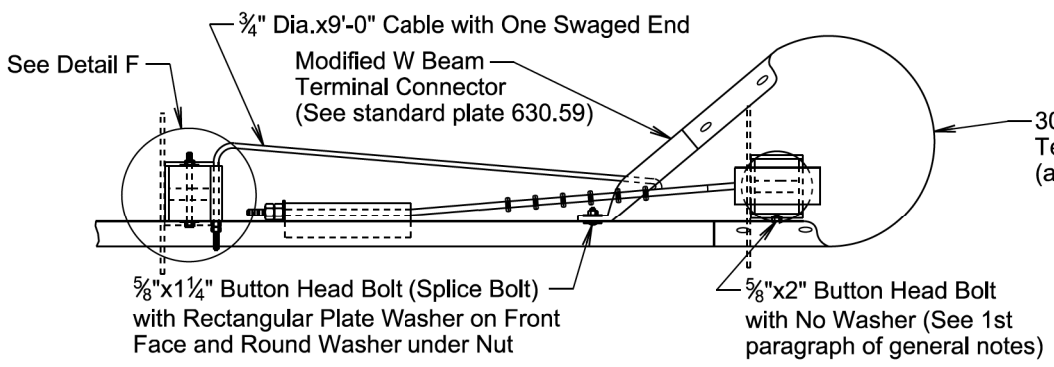
⧄ See standard plate 630.99



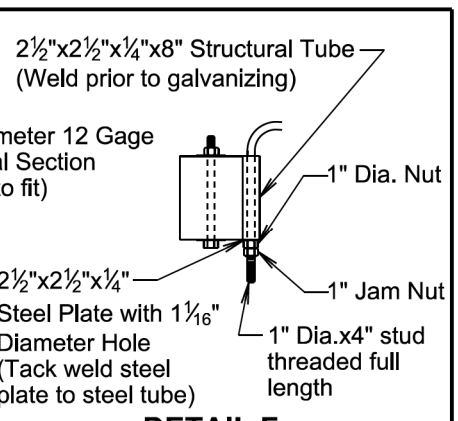
SECTION E-E
(CRT Post)



SECTION D-D
(W Beam Guardrail Post)



PLAN VIEW
(W Beam Guardrail Special Anchor Assembly)

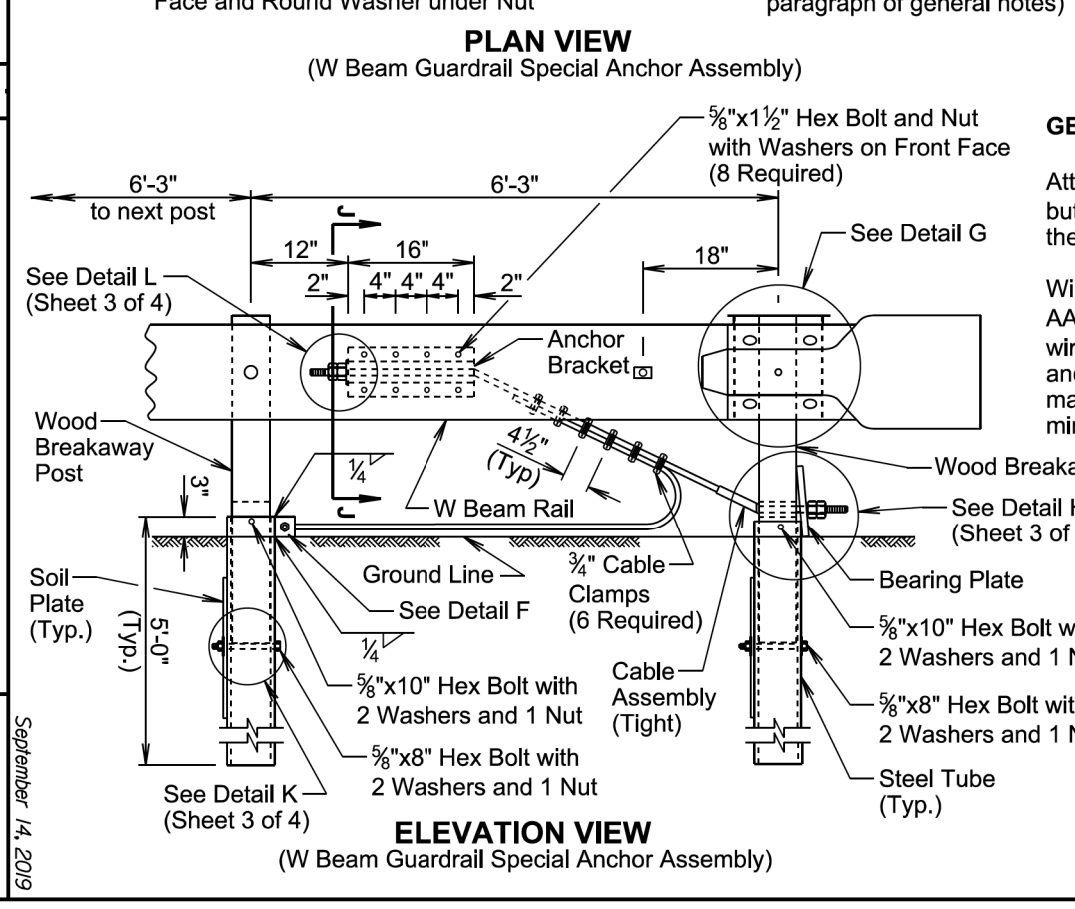


DETAIL F
PLAN VIEW

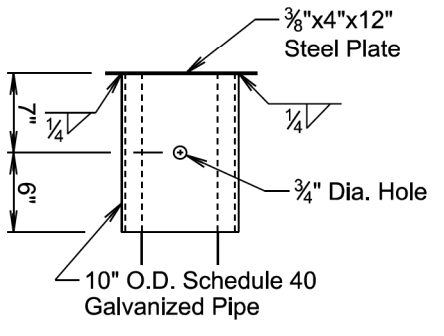
GENERAL NOTES:

Attach W beam rail to the steel pipe with a ⅝"x2" button head bolt with no washer. Connection to the post is NOT required.

Wire rope will conform to the requirements of AASHTO M 30, will be ¾ inch (6x19) preformed wire strand core or independent wire rope core, and will be galvanized. The wire rope will be manufactured of improved plow steel with a minimum breaking strength of 42,800 pounds.



ELEVATION VIEW
(W Beam Guardrail Special Anchor Assembly)



DETAIL G
(Guardrail and Terminal Section not shown)

Published Date: 2024

SDDOT

SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY

PLATE NUMBER 630.84

Sheet 2 of 4

September 14, 2019

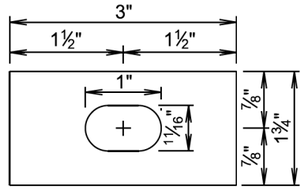
Plotting Date: 02/02/2024

STATE OF SOUTH DAKOTA

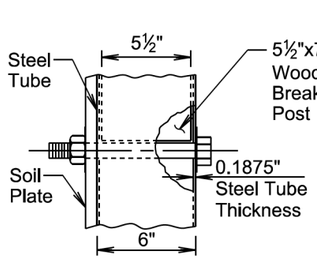
PROJECT NH-P-PH 0079(87)129 NH 0212(193)28

SHEET B43

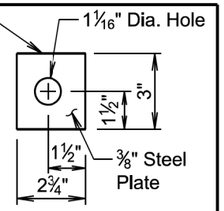
TOTAL SHEETS B50



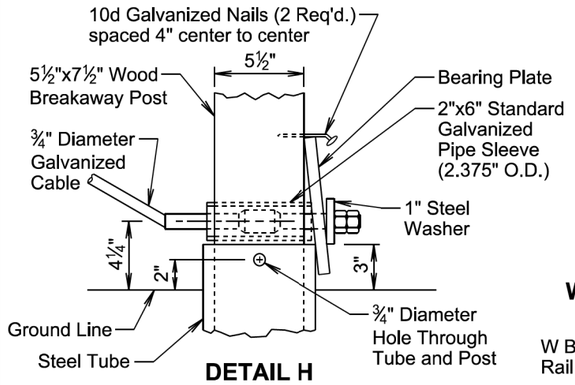
RECTANGULAR PLATE WASHER



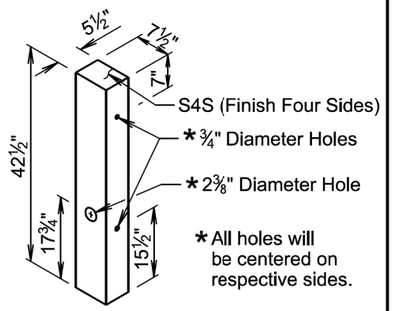
DETAIL K



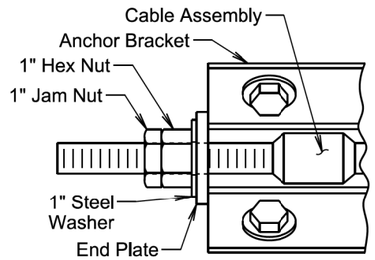
END PLATE FOR ANCHOR BRACKET



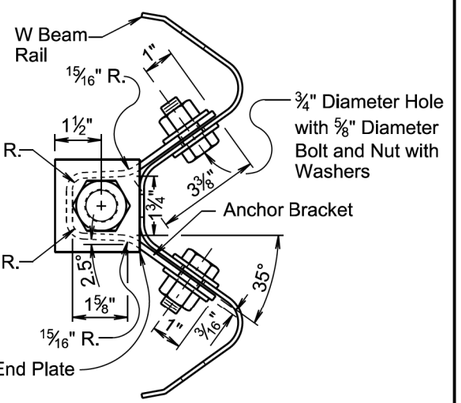
DETAIL H



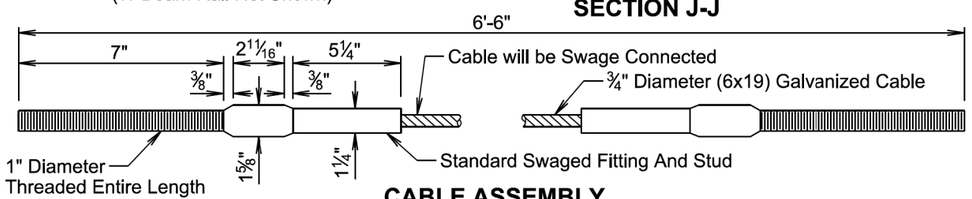
WOOD BREAKAWAY POST



DETAIL L
(W Beam Rail Not Shown)



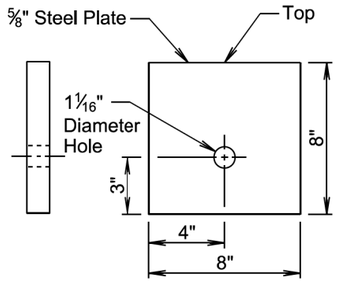
SECTION J-J



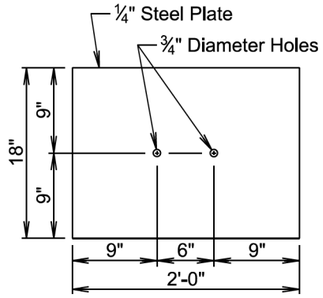
CABLE ASSEMBLY

September 14, 2019

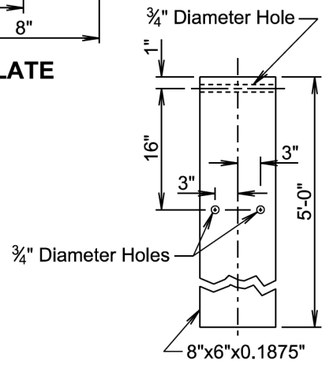
Published Date: 2024	SDDOT	SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY	PLATE NUMBER 630.84
			Sheet 3 of 4



BEARING PLATE



SOIL PLATE



STEEL TUBE

GENERAL NOTES:

The wood breakaway post will be in conformance with Section 630.2 A of the Specifications.

The bolts will be in conformance with ASTM A307 and the nuts will be in conformance with ASTM A563, Grade A or better. The bolts and nuts will be galvanized in accordance with ASTM A153.

All angles, channels, and plates will conform to the requirements of ASTM A36 and the structural tubing will conform to ASTM A500. Welding will meet the current requirements of the Structural Welding Code AWS D1.1. All structural steel will be galvanized in accordance with ASTM A123. Punching, drilling, cutting, or welding will NOT be permitted after galvanizing.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

All costs for constructing the straight W beam guardrail with CRT posts including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware will be incidental to the contract unit price per foot for "Straight Class A W Beam Guardrail with CRT Posts".

All costs for constructing the curved W beam guardrail with CRT posts including labor, equipment, and materials including all CRT posts, steel beam rail, and hardware will be incidental to the contract unit price per foot for "Curved Class A W Beam Guardrail with CRT Posts".

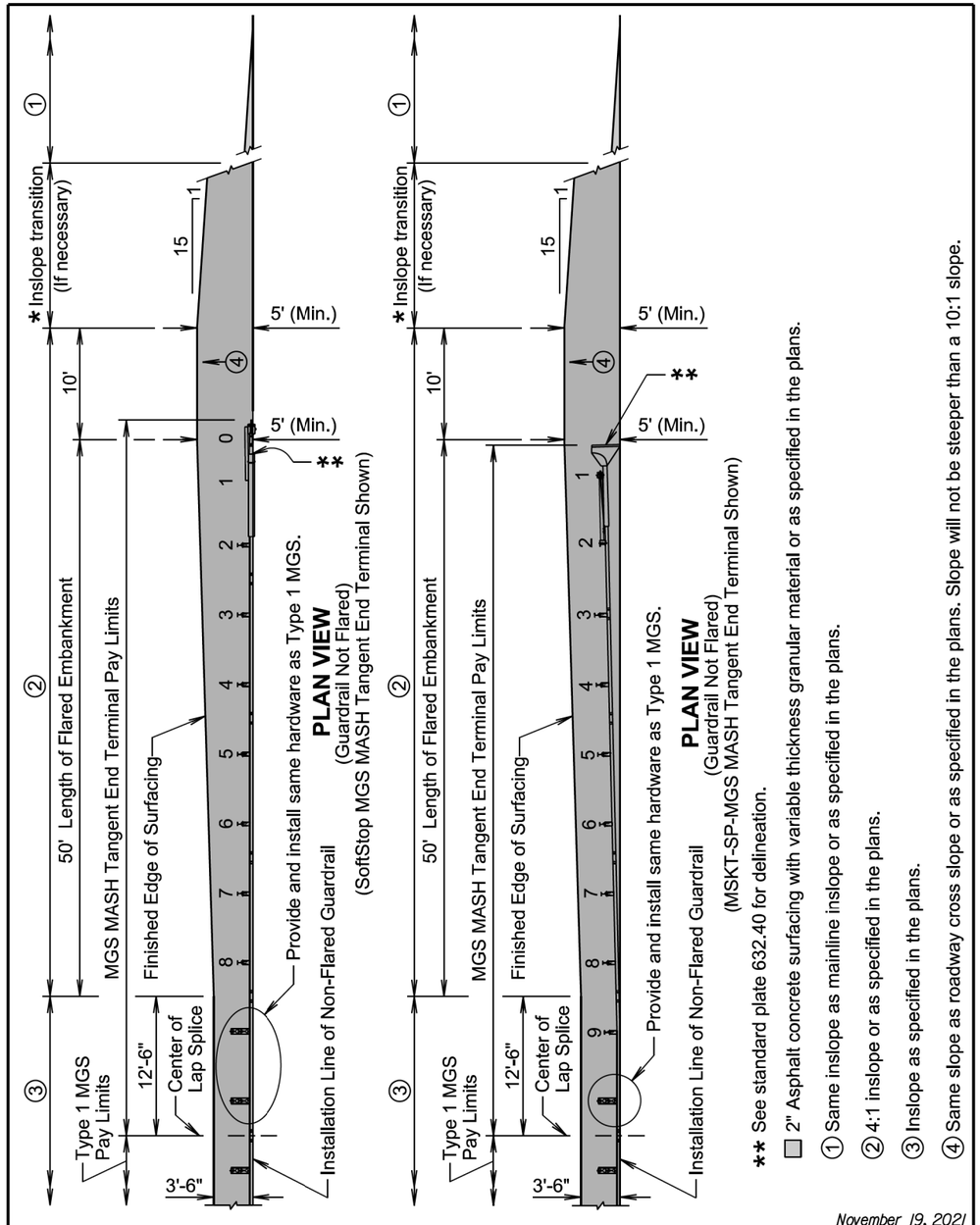
All costs for constructing the W beam guardrail special anchor assembly including labor, equipment, hardware, and all components of the W beam guardrail special anchor assembly except the W beam rail will be incidental to the contract unit price per each for "W Beam Guardrail Special Anchor Assembly". The 12'-6" length of W beam rail located within the W beam guardrail special anchor assembly will be paid for per foot with the contract item "Straight Class A W Beam Guardrail with Wood Posts".

September 14, 2019

Published Date: 2024	SDDOT	SHORT RADIUS W BEAM GUARDRAIL AND SPECIAL ANCHOR ASSEMBLY	PLATE NUMBER 630.84
			Sheet 4 of 4

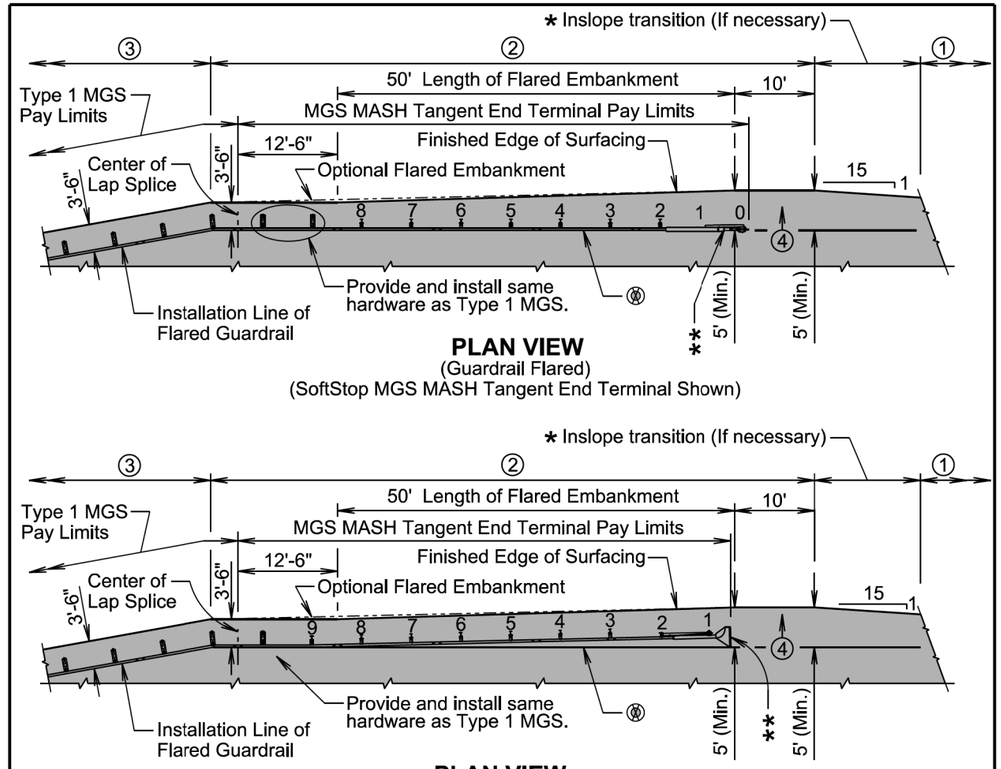
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B45	B50

Plotting Date: 02/02/2024



November 19, 2021

Published Date: 2024	SDDOT	EMBANKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 1 of 2



GENERAL NOTES:

The MGS MASH tangent end terminals above are for illustrative purpose only. Pay limit length of the MGS MASH tangent end terminal is 62'-6".

* The length of inslope transition varies with the amount of change between inslopes. The length of the transition will change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.

Ⓜ The installation reference line for MGS MASH tangent end terminals will always be parallel to the roadway.

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite."

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

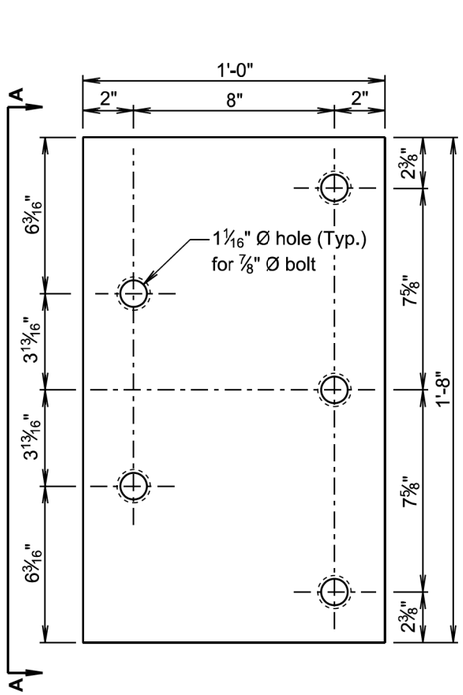
November 19, 2021

Published Date: 2024	SDDOT	EMBANKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 2 of 2

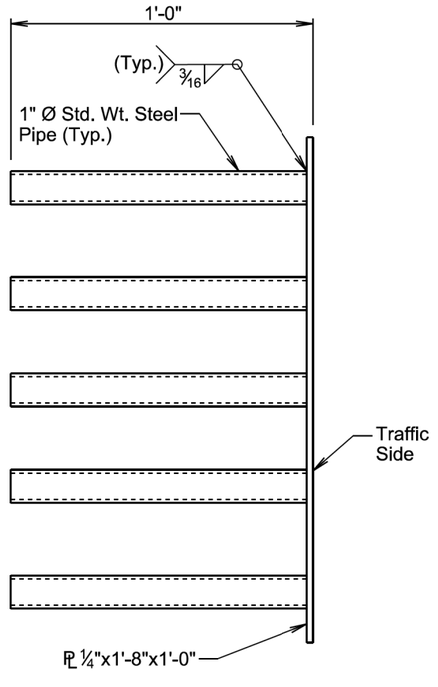
Plot Scale - 1:200

Plotted From - TRRC11626

File - ...\SectionB_StandardPlates.dgn



ELEVATION VIEW



VIEW A - A

GENERAL NOTES:

Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53 or ASTM A500, Grade B.

Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.

After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

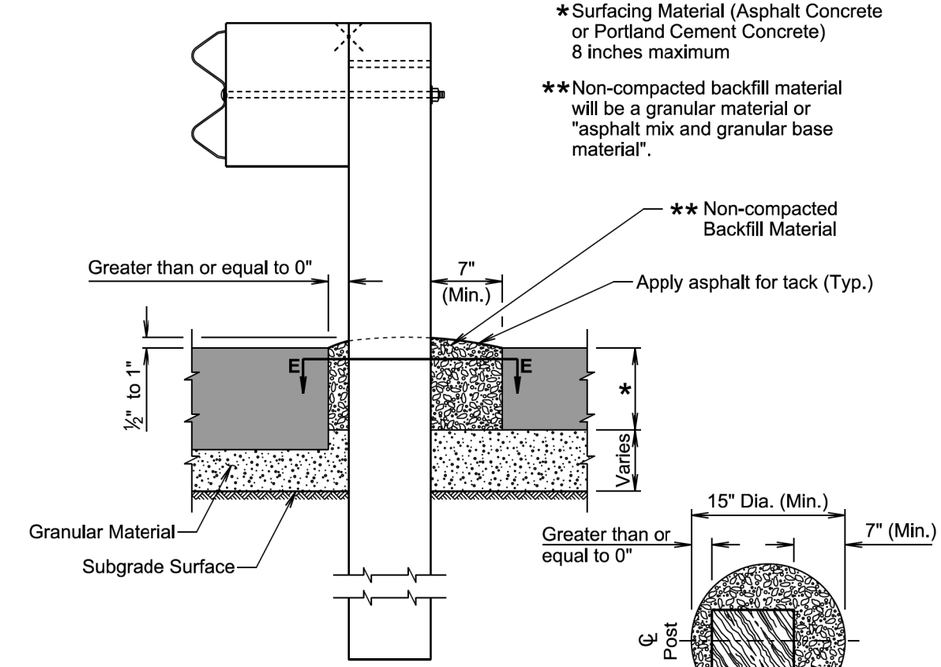
Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F-1554 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.

Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

August 27, 2020

Published Date: 2024	SDDOT	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92 Sheet 1 of 1



TRANSVERSE SECTION
(Wood post shown for illustrative purpose only)

SECTION E-E
(Round option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

GENERAL NOTES:

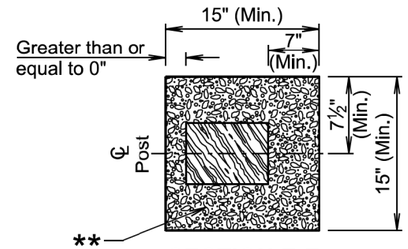
The leave-out limits may be increased to accommodate construction equipment and tolerances.

When posts are installed in augured or dug holes, the backfill material will be compacted to the bottom of the pavement surfacing material to the satisfaction of the Engineer. The backfill material for the thickness of the pavement surfacing material will be non-compacted.

The backfill material will be mounded ½ inch to 1 inch above the top of the adjacent surfacing as illustrated above.

Asphalt for tack will be applied to the surface of the backfill material at the rate of 0.15 to 0.20 gallons per square yard.

All costs for constructing the leave-out including labor, equipment, and materials which includes the backfill material and tack coat will be incidental to the contract unit price for the respective guardrail contract item.



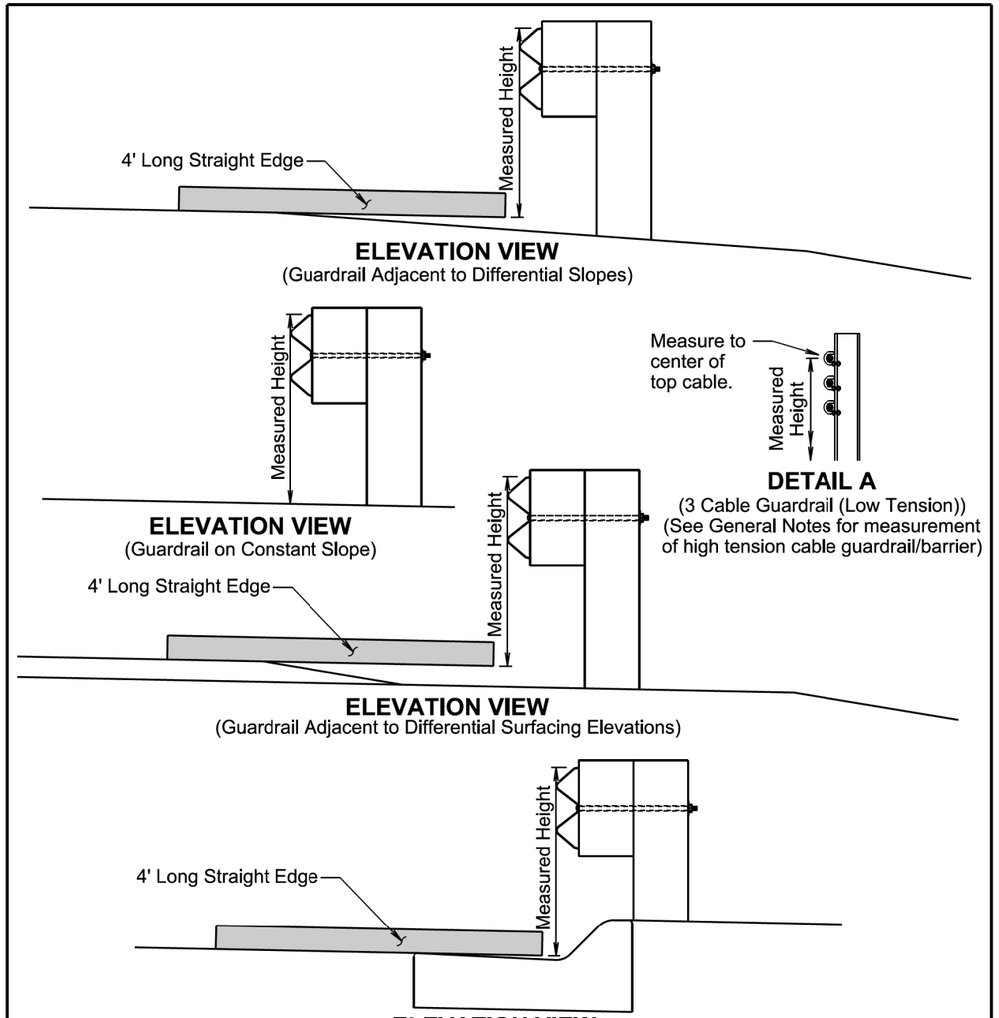
SECTION E-E
(Square option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

November 19, 2021

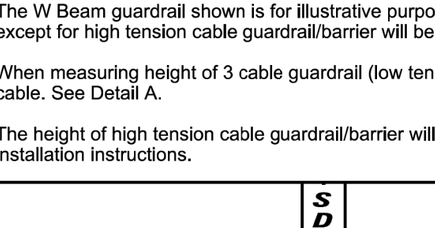
Published Date: 2024	SDDOT	GUARDRAIL POST INSTALLED IN ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE	PLATE NUMBER 630.96 Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B47	B50

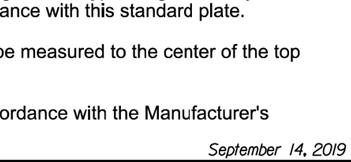
Plotting Date: 02/02/2024



ELEVATION VIEW
(Guardrail Adjacent to Differential Slopes)



ELEVATION VIEW
(Guardrail on Constant Slope)



DETAIL A
(3 Cable Guardrail (Low Tension))
(See General Notes for measurement of high tension cable guardrail/barrier)

ELEVATION VIEW
(Guardrail Adjacent to Differential Surfacing Elevations)

ELEVATION VIEW
(Guardrail at Curb and Gutter)

GENERAL NOTES:

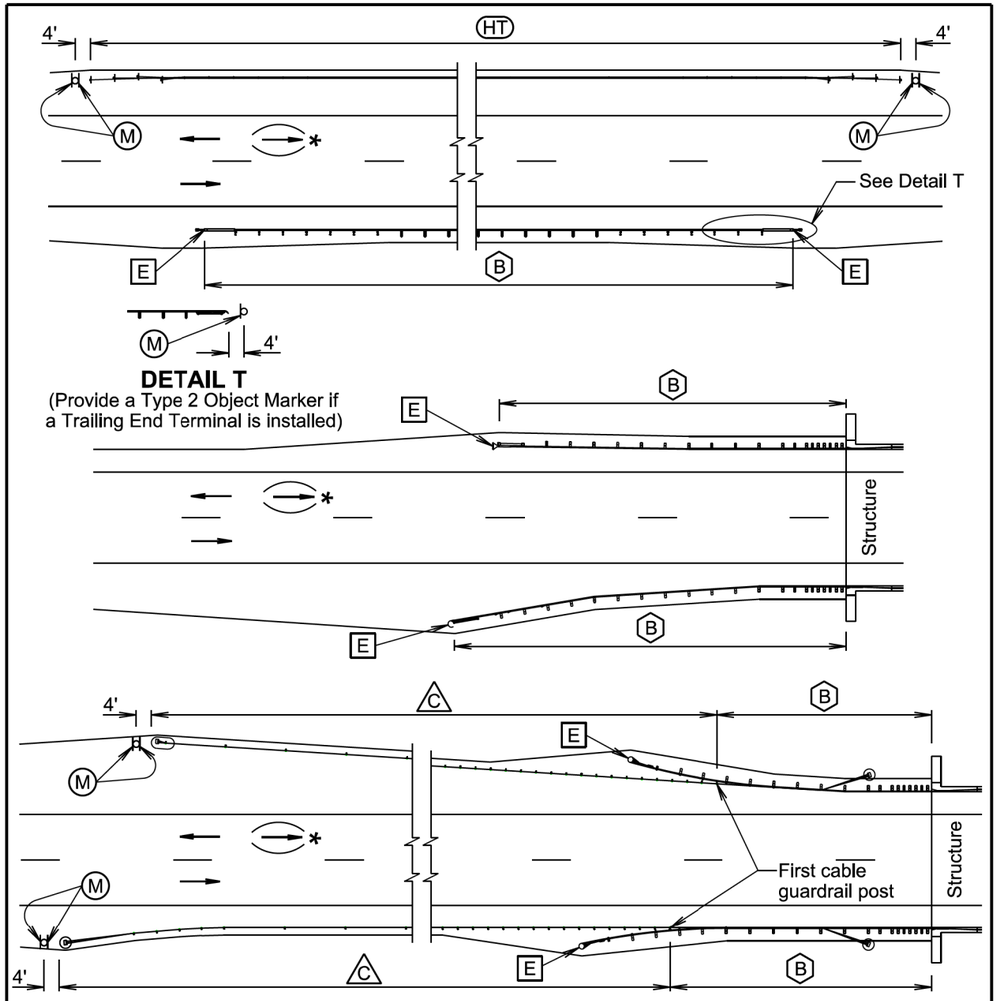
The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems except for high tension cable guardrail/barrier will be measured in accordance with this standard plate.

When measuring height of 3 cable guardrail (low tension) the height will be measured to the center of the top cable. See Detail A.

The height of high tension cable guardrail/barrier will be measured in accordance with the Manufacturer's installation instructions.

September 14, 2019

Published Date: 2024	SDDOT	***MEASURING GUARDRAIL HEIGHT***	***PLATE NUMBER*** 630.99 *Sheet 1 of 1*



DETAIL T
(Provide a Type 2 Object Marker if a Trailing End Terminal is installed)

PLAN VIEW
(Typical Guardrail Layouts)

- (B) Steel Beam Guardrail Delineation
- (HT) High Tension Cable Guardrail Delineation
- [E] Guardrail End Terminal Object Marker
- (M) Type 2 Object Marker
- △C 3 Cable Guardrail (Low Tension) Delineation

* For two-way traffic, install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic, single-sided delineation for one-way traffic.

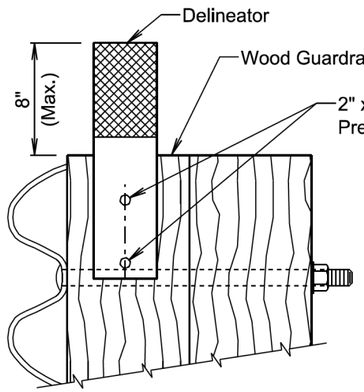
December 23, 2019

Published Date: 2024	SDDOT	***DELINEATION OF GUARDRAIL***	***PLATE NUMBER*** 632.40 *Sheet 1 of 4*

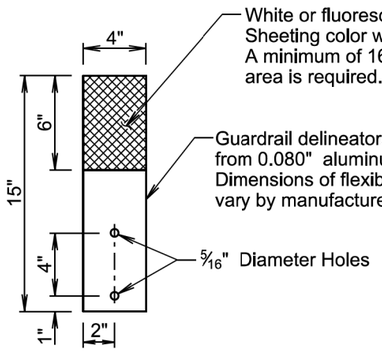
Plot Scale - 1:200

Plotted From - TRRC11626

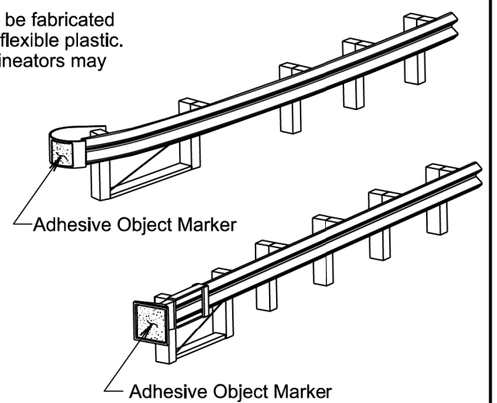
File - ...\SectionB_StandardPlates.dgn



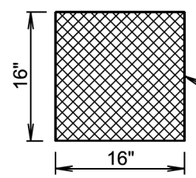
(B) STEEL BEAM GUARDRAIL DELINEATION



DELINEATOR
(For Steel Beam Guardrail)



(E) GUARDRAIL END TERMINAL OBJECT MARKER

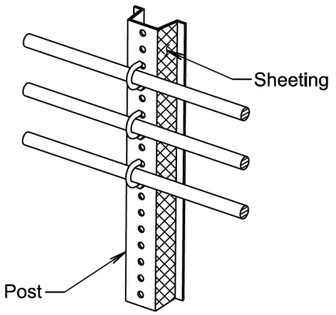


ADHESIVE OBJECT MARKER

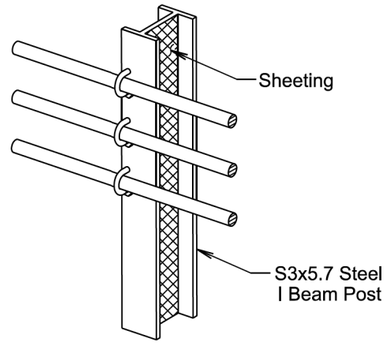
Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting will be fluorescent yellow.

December 23, 2019

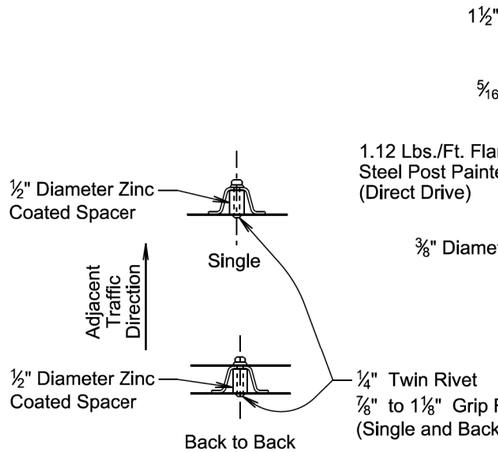
Published Date: 2024	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 2 of 4



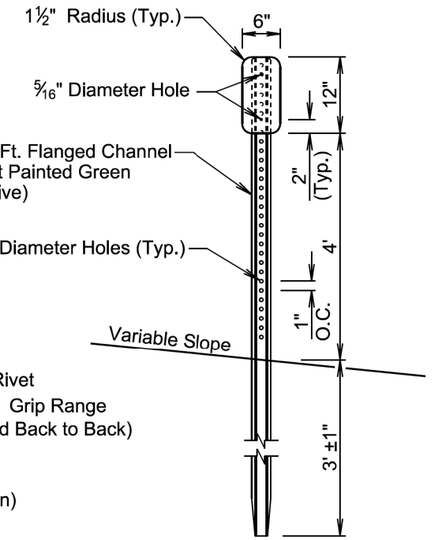
(C) 3 CABLE GUARDRAIL (LOW TENSION) DELINEATION



(C) 3 CABLE GUARDRAIL (LOW TENSION) DELINEATION



PLAN VIEW
(Type 2 Object Marker Details and Post Orientation)



ELEVATION VIEW
(M) (Type 2 Object Marker)
(For Marking 3 Cable Guardrail (Low Tension) Anchor, High Tension Cable Guardrail Anchor, and Trailing End Terminal)

December 23, 2019

Published Date: 2024	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 3 of 4

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B49	B50

Plotting Date: 02/02/2024

Plot Scale - 1:200

GENERAL NOTES:

The delineation of high tension cable guardrail will be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting will be type XI in conformance with ASTM D4956. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The delineators for steel beam guardrail and sheeting on 3 cable guardrail (low tension) posts will be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting will be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting will be on both sides of the delineators and guardrail posts and will be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

When steel beam guardrail is attached to a bridge the first delineator will be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object marker. The spacing between the delineators will be approximately one third of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, including bridges that have steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

Steel beam guardrail that is not attached to a bridge and is less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object markers. The spacing between the delineators will be approximately one third of the length of the guardrail.

Steel beam guardrail that is not attached to a bridge and is 200 feet and greater in length, including steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation on 3 cable guardrail and steel beam guardrail will be included in the contract unit price per each for "Guardrail Delineator".

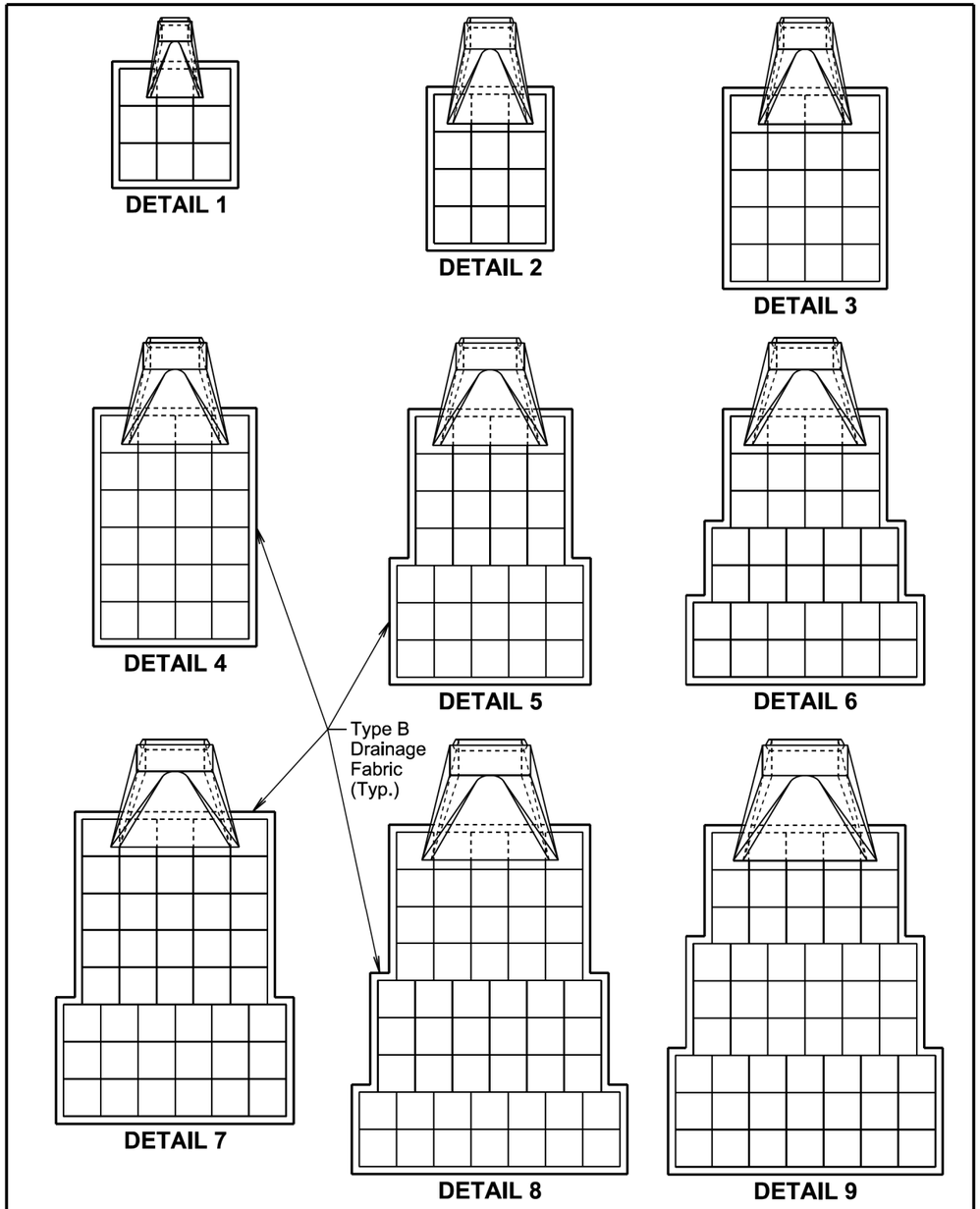
All costs for furnishing and installing the reflective sheeting on the cable spacers or post caps for the high tension cable guardrail will be incidental to the respective high tension cable guardrail contract item.

An adhesive object marker will be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting will be fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the adhesive object marker will be incidental to various contract items.

A type 2 object marker will be placed adjacent to the 3 cable guardrail (low tension) anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") will have fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware will be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

December 23, 2019

Published Date: 2024	SDDOT	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 4 of 4



February 14, 2020

Published Date: 2024	SDDOT	BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS	PLATE NUMBER 720.03
			Sheet 1 of 2

Plotted From - TRRC11626

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	B50	B50

Plotting Date: 02/02/2024

	Detail	Pipe Diameter (Inches)	Gabion (Cu. Yd.)	Type B Drainage Fabric (Sq. Yd.)
		* ESTIMATED QUANTITIES		
RCP, RCP Arch, CMP, and CMP Arch	1	12, 18, and 24	4.5	15
	2	30 and 36	6.0	19
	3	42	10.0	29
	4	48 and 54	12.0	34
	5	60	15.5	43
	6	66	17.0	47
	7	72	21.5	57
	8	78	26.0	68
	9	84	27.0	70

GENERAL NOTES:

Gabions at outlets of CMP and RCP will be placed under the end section a distance of 2 feet from the outlet end. For CMP end section installations, the upper fabric of the gabions will be modified to accommodate the metal end section as approved by the Engineer.

* Gabion and type B drainage fabric quantities on this standard plate are based on standard gabion sizes D, E, and F as depicted on standard plate 720.01.

Type B drainage fabric will be placed under the gabions and around the exterior sides (perimeter) of the gabions as approved by the Engineer. The type B drainage fabric will be in conformance with Section 831 of the Specifications. Measurement and payment of the type B drainage fabric will be in conformance with Section 720 of the Specifications.

February 14, 2020

Published Date: 2024	SDDOT	***BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS***	***PLATE NUMBER*** *720.03* *Sheet 2 of 2*

Plot Scale - 1:200

Plotted From - TRRC11626

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